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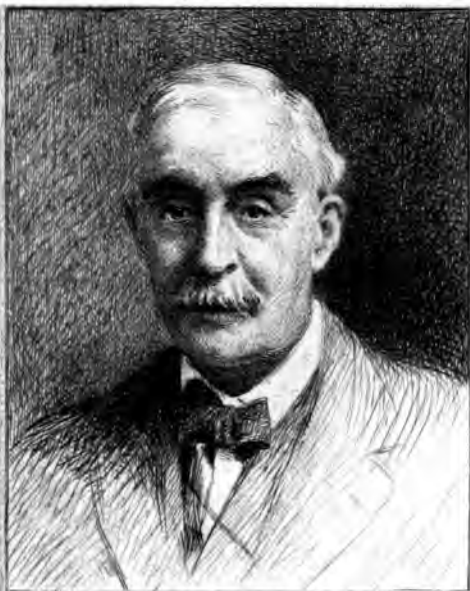
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HIGHER EDUCATION
IN
GERMANY AND ENGLAND

CHARLES BIRD



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HIGHER EDUCATION



THE REALGYMNASIUM: STUTTGART.

HIGHER EDUCATION

IN THE ENGLAND

OF THE

UNIVERSITY OF CAMBRIDGE IN THE UNIVERSITY
OF OXFORD IN THE UNIVERSITY OF EDINBURGH
IN THE UNIVERSITY OF GLASGOW IN THE UNIVERSITY OF
DUBLIN IN THE UNIVERSITY OF LONDON

BY
CHARLES BIRD, B.A., F.R.S.

PROFESSOR OF THE HISTORY OF THE UNIVERSITY OF
CAMBRIDGE

LONDON

PAUL, TRENCH & CO., & PATERNOSTER SQUARE

1884



HIGHER EDUCATION

IN

GERMANY AND ENGLAND

BEING

A BRIEF PRACTICAL ACCOUNT OF THE ORGANIZATION
AND CURRICULUM OF THE GERMAN HIGHER SCHOOLS
WITH CRITICAL REMARKS AND SUGGESTIONS
WITH REFERENCE TO THOSE OF ENGLAND

BY

CHARLES BIRD, B.A., F.G.S.

HEAD-MASTER OF SIR J. WILLIAMSON'S MATHEMATICAL SCHOOL
AT ROCHESTER

LONDON

KEGAN PAUL, TRENCH & CO., 1, PATERNOSTER SQUARE

1884



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TO THE MEMORY
OF THE
REV. HUGH GEORGE ROBINSON, M.A.,
LATE ENDOWED SCHOOL
AND CHARITY COMMISSIONER,
WHO DEVOTED MANY YEARS OF A LABORIOUS LIFE
TO THE FURTHERANCE OF OUR
HIGHER EDUCATION.

PREFACE.

THE twofold object of this small book is set forth on the title-page.

The descriptive portion at any rate, especially the schemes of work, will, I trust, be interesting and useful to fellow schoolmasters.

As an explanation of, rather than as an excuse for, the somewhat disconnected style and occasional repetitions, I mention the fact that it has been written during the short intervals of leisure of a rather busy term.

In connection with the work, I wish to tender my thanks to Rector Œlschläger and Professors Assfahl and Somnier of Stuttgart, and to my colleague Dr. Julius Grözinger, for much kind assistance.

C. B.

ROCHESTER, *July*, 1884.

POSTSCRIPT.

THE president of the Chemical Society in his anniversary address this year laments the falling off of chemical research, and contrasts the incessant flow of work from the German universities with the dribblets which at intervals emanate from our own. He goes on to say, "If we turn to the other laboratories connected with our colleges, hospitals, etc., with how few exceptions do we find any appreciable amount of work being carried on for the extension of the boundaries of our Science ; in fact, speaking in a general way, the work of our laboratories consists mainly in the students carrying out the ordinary course of qualitative and quantitative analysis, and attending one or two courses of lectures." And so on in a similar strain for five or six pages. At the schools they do nothing ; at the colleges, hospitals, and universities they do what should have been done at school, and so they never reach higher work at all.

C. B.

HIGHER EDUCATION.



I.

6✓

THE educational position in England at present may be briefly stated as follows:—The State assumes the responsibility of providing schools for elementary education. Where necessary it compels their erection, and then inspects and subsidizes them, and they also, under certain conditions, obtain assistance from the rates. These schools are especially adapted to the needs of the labouring population, whose children leave to earn their living at the age of twelve or thirteen ; but they are also assumed to be fit to serve as preparatory schools for those

whose education is to be continued to a later period, and if there happens by chance to be a higher school anywhere near, they are occasionally linked to it by means of scholarships.

Beyond these elementary schools the State disclaims all but the very slightest responsibility. It neither founds, inspects, nor subsidizes, but only "re-organizes." Whether any given locality shall have a higher school or not, depends, as a rule, either on the course events happened to take in that particular neighbourhood at the time of the Reformation or on local philanthropy. Our higher schools are for this reason planted over the country with about as much regard to national wants as if they had been dropped from a pepper-box. Some towns have two, some one, but the greater number, especially our large modern towns, have none, while many are in small country villages, where they are either doing the work of elementary schools or are converted into boarding schools. Some

have incomes large enough to give every pupil in attendance a hundred a year, and some, often those in our largest towns, have very little. They are almost invariably for boys only. To supply deficiencies, companies have begun to provide "high schools," "girls' public day schools," "middle-class schools," "Church of England schools," each according to its own notion of what is right and proper. But our higher schools of all kinds bear a very small ratio to the national requirements if we are to place ourselves abreast of continental countries in this matter.

In those towns which are so fortunate as to be provided with two higher schools, people are in the habit of considering that the educational difficulty is completely overcome. There are the elementary schools for the working classes, a secondary school with moderately high fees, and another with fees higher still, adapted respectively, not so much to the requirements,

as to the purses of what in a provincial town constitute the middle and upper classes. Add to this a "middle-class" girls' school, and we have an educational Utopia. An English town with such an equipment is certainly to be envied, for many of our large towns, having no endowment to "re-organize," are still dependent on the transitory, irresponsible, and often incompetent, private schoolmaster, and it is still doubtful how the requirements of such unfortunate towns are to be met. But when this difficulty is surmounted, and all our towns are supplied in the Utopian manner just described, it is fondly imagined that our national scheme of education will be indeed complete. For what more, it may be asked, can be wanted than schools for the working classes at ten shillings a year, a school for the middle classes at five pounds a year, and another for the upper classes at fifteen pounds a year, each school teaching such subjects as are considered suitable for that station in life in which

their parents have the misfortune or the privilege to move. Add to this a scheme for granting exhibitions from the lower schools to the middle, and from the middle to the higher, and it seems almost impossible for most people to imagine a state of things more perfect. An English town having, say, in its highest school two hundred boys, in its middle school five hundred, and in its elementary schools the remainder of its children, would be a place to visit and quote in blue-books, or, if one had independence and a family, to go and live at and profit by and be thankful for.

Most people have a vague idea that they are somewhat ahead of us abroad in their educational arrangements, but probably few realize to what an extent we are surpassed by Germany, not only as regards the liberal provision made for higher education, but in the careful manner in which the schools are adjusted to the wants of the people. The only idea which we seem to

have in England about the organization of higher education is with regard to what is called grading. We have our "first grade," "second grade," and "third grade" schools. Our first grade schools prepare for the university and, as a rule, teach much classics, some mathematics, and occasionally science. They are for the "upper classes," and such members of the "middle classes" as obtain scholarships to assist them in paying the fees, which are generally twice as high as they need be. Our second and third grade schools are generally what is called "modern," and are for the "middle" and "lower middle" classes. As the boys do not stay long enough to learn Latin and Greek according to our approved English methods without devoting the whole of their time to them, science is generally taught instead to a large extent, partly also because it is popularly, and indeed truly, supposed to be more useful to the classes catered for. This,

and our system of scholarships to enable a poor but clever boy to pass upwards from the elementary school to the university, constitutes our "system," which is, moreover, as I have said, of the most fragmentary and casual description, whole districts being entirely without a higher public school of any kind whatever.

Such being the case, a recent visit to Stuttgart has suggested the idea of giving a brief practical description of the educational equipment of a German town, and of instituting a comparison between what we are trying and hoping to realize in England and what they have already done in Germany.

Most schoolmasters who are interested in their profession, if one may presume to call it so, have no doubt read Mr. Matthew Arnold's book, together with plenty of the other available literature on the subject ; but, so far as I can learn, there is not in any accessible form such a detailed account of a German school as can be

made of practical use to any English head-master who is desirous of imitating what he may think good in the German system. Moreover, there is no doubt that English schoolmasters do not fully realize how inferior we are to the Germans in educational matters. It is hoped that the following pages will supply them with some useful and practical information, and at the same time emphasize our deficiencies.

The choice of Stuttgart was due to accidental circumstances. I do not know whether it is the best or the worst educated town in Germany. Being, however, the capital of Wurtemberg, a state which has paid much attention to education, it is probably not, at any rate, behind the age.

According to Baedeker (1883), the population of Stuttgart is 117,303.

Besides the Polytechnic, which may be regarded as a State, rather than a municipal, institution, the town possesses three day schools of the highest grade :—

1. The *Gymnasium*, or classical school, consisting on account of its size of two schools, containing between them about 1300 pupils.

2. The *Realgymnasium*, or semi-classical school, containing 900 boys.

3. The *Realschule*, or modern and scientific school, with 1100 boys.

All these schools are what we should call "first grade," *i.e.* they keep their pupils till the age of nineteen and upwards, and send them direct either to the university or to the Polytechnic, a scientific institution of university rank.

Below these schools is the *Burger schule*, a "second grade," "middle-class," or "commercial" school, with about 1100 boys.

For girls there are two high schools of equal rank, each with 400 or 500 pupils, and there is a "*Burger schule*" for girls with about 1000, built near and exactly similar to that for boys.

Disregarding for the present other special

institutions, there are in this town of 120,000 people—

In the high schools: Boys	...	...	3300	} 4200
„ „ Girls	...	...	900	
In the middle schools: Boys	...	...	1100	} 2100
„ „ Girls	...	...	1000	
Grand total receiving an education higher than elementary				6300

The Endowed Schools Commission reckoned that there were available for higher education in England not less than 10 or more than 20 per thousand.* There are few English towns where the minimum is reached, none I think where the number rises anywhere near the maximum. In Stuttgart the number actually in the higher schools, omitting those in universities and technical institutions, is 52 per thousand. These figures bring out at once the leading difference between English and German

* They recommended *ultimate* provision for 16, and *immediate* provision for 10 per thousand.—Report, vol. i. p. 99. This was in 1868.

higher education. In England it is the luxury of the few, in Germany it can be got by all who want it. In an English town nearly all the children are in the elementary schools, if they are at school at all ; * in a German town half of them are in the higher schools.

The reasons for this difference are, firstly, perhaps, the more general appreciation of a good education among the people themselves ; secondly, the lowness of the fees—three guineas being the highest fee at Stuttgart for resident natives ; and, thirdly, the advantages offered by the State in the shape of shortened military service to those who pass beyond a certain point in the schools.

From English experience one would expect the competition for pupils between the three upper schools to be very severe, each school

* Mr. Sneyd Kinnersley, H.M.'s Inspector for the Chester district, in his report for 1882, says that 17,143 out of the 20,000 children in Birkenhead *ought* to be in the elementary schools (*i.e.* six-sevenths).

trying to offer special advantages and arranging to teach everything. Each school does indeed offer special advantages, each of its own kind, but the course of studies is rigidly fixed by the State. This, and the fact that the head masters' salaries do not depend on the number of their pupils, may perhaps account for the absence of all rivalry. The schools never advertise, or use any of those extraneous aids to publicity which seem to be a necessity with us. Masters take boarders who attend their own school or another quite indifferently.

I now propose to describe somewhat in detail the organization and work of these three typical schools, giving a brief description of such institutions as are supplementary to them, concluding with a few comparisons between German schools and our own, and with suggestions for the improvement of the latter.

II.

THE population of the kingdom of Wurtemberg is 1,800,000. Except Stuttgart, there is no town in the country which reaches a population of 35,000, so that, although well supplied with schools, most of them are comparatively small and will not bear comparison with those of the capital which it is proposed to describe. Before doing so, however, it may be desirable to give a few educational statistics relating to the whole kingdom. They are compiled from an official report for the year 1882, and relate to boys only.

There are 164 higher schools, containing 15,893 pupils. Of these schools 92, although sometimes bearing different names, correspond either to the Gymnasium or Real Gymnasium, or

in the smaller towns to both ; that is to say, they all teach Latin, and 81 of them teach Greek. 9352 boys are reported as under instruction in Latin, and 3579 in Greek. 1760 pupils entered these schools during the year, and 1665 left them, figures which seem to suggest that boys stay at the schools on an average between eight and nine years. Of the pupils who left, 320 entered a university, 8 entered the Polytechnic school, 22 entered a military or naval school, about 400 went to other schools, and 666 into professions or business ; the remainder either left Wurtemberg, died, or are unaccounted for.

Of Real Schools, or their equivalents, there are 72, with 6541 pupils. In this number is included the upper portion of the Stuttgart Burger School for boys. The number of entries for the year was 1414, and of withdrawals, 1502. Of the latter only 2 went to a university, 39 entered the Polytechnic, 3 went to mili-

tary schools, 6 to the *Baugewerk schule*—a “technical college” as we should call it—at Stuttgart, and the great bulk of the remainder entered into professions or business. Boys seem to stay a much less average time at these schools than at the preceding class, a circumstance no doubt due to the fact that the course is more suited to the wants of boys who leave at a comparatively early age.

With this brief introduction, I will proceed to speak more particularly of the Stuttgart schools, which may be taken as types of their respective classes, and of these more especially the three high schools, viz. the Gymnasium, Real Gymnasium, and the Real School; and as they have many points in common, the Real School will in many respects serve as a type of the three.

The educational question appears to have been well thought out in Germany years ago, and they now know exactly what they want and how to set about to obtain it. Having ascer-

tained the most convenient form of school building, and the best arrangement of rooms and furniture, the proper subjects to teach, and the relative amount of time they require, they have stereotyped it; and when a new school is to be erected, it is built, fitted, and organized according to the approved model. It may lead to a considerable amount of uniformity, but they seem to consider this an additional advantage.

The schools are generally massive, three or four storied stone buildings, quadrangular in shape, well lighted, and easily accessible in every part by broad stone corridors. They contain thirty or forty, or even more, class-rooms, according to the size of the school, all arranged on the same principle. On entering each class-room the desks are on the left hand, and the windows in the wall opposite the door, thus securing a light on the left of each pupil as he sits at his desk. The ventilation is gene-

rally secured by an arrangement similar to that known in England as Tobin's, and the tops of the windows open widely. The rooms are heated by hot water, and are usually provided with a thermometer. On the wall in which the door opens, that is opposite the windows, is a row of pegs for caps and coats, an arrangement which no doubt prevents much confusion, but which certainly is open to objection.* A master's desk, a book cupboard, and a class time-table complete the furniture.

The rooms are very spacious, and the newer desks, such as those which have just been placed in the Real Gymnasium, are excellent. The class-rooms for the higher forms of this school are provided with desks which, by a very ingenious and simple arrangement, can be used by the pupil either sitting or standing, the change being made instantly and without re-

* I think I remember to have seen at the Sheffield Central Board School, a small cloak-room connected with each class-room. This seems perfection.

moving or spilling the ink. The drawing class-rooms are generally long rooms, with flat tables placed transversely, and spacious cupboards along the walls for casts and copies. Like the class-rooms, they are lighted from the left side only. Where science is taught there is a good lecture-room and collection of physical and chemical apparatus, and the natural history collections would often be sufficient to stock one of our provincial museums.

There is no room exactly corresponding to our large school-room, and the boys do not assemble together at all. The *aula*, or *fest-saal*, is a comparatively small and often highly decorated room, where the prizes and certificates are bestowed in the presence of official personages at the end of the school year. Excellent and commodious rooms are also provided for the rector and the assistant-masters, the latter body often as numerous as the boys in many of our schools.

Everything about the buildings suggests the idea that they have been carefully adapted to the work to be done in them. The entrances are large, the passages broad, straight, and well-lighted, and the staircases roomy and of easy slope. The Real Gymnasium of Stuttgart was only completed a year or two ago, and may be probably taken as a type of the modern German school building. It cost £44,000.* Its plan is perfectly simple ; it is rectangular and three-storied, each story practically a reproduction of the others. Much attention, as will be seen, is given to gymnastics, and a large well-fitted gymnasium is attached to each school.

The Real Gymnasium is the best school building in Stuttgart, but that of the Real School is, as far as utility is concerned, very little behind it. Like the Real Gymnasium, it is of massive stone, and cost, I was told, about £30,000. The Gymnasium is the oldest school,

* Paid for out of the French war indemnity.

and has not a good building, but a new one is in course of construction, which will not be inferior to the others.

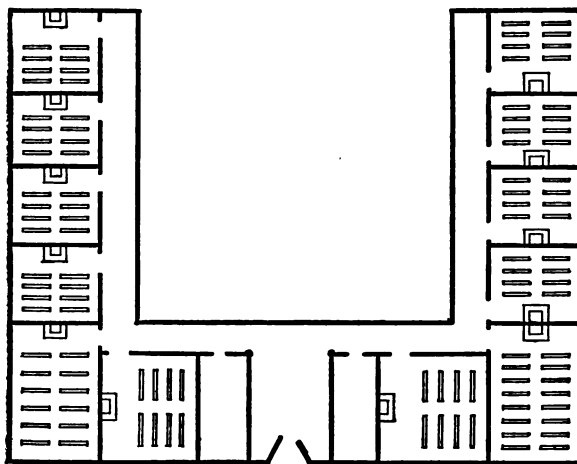
The two Burger schools are built near one another and are exactly alike. They are rectangular and four-storied, with the entrances in the centre of the ends of the rectangle. A very broad corridor runs from end to end through the middle of each floor, and there is a staircase at each end. They stand quite isolated in a large enclosure, with a gymnasium between them, which they use in common at different hours.

The other girls' schools are somewhat similar in plan and general arrangements.

The two types of building generally adopted are, either a rectangular building (I.), almost square in plan, with a courtyard let in behind ; or a narrower building, with an entrance at the end (II.).

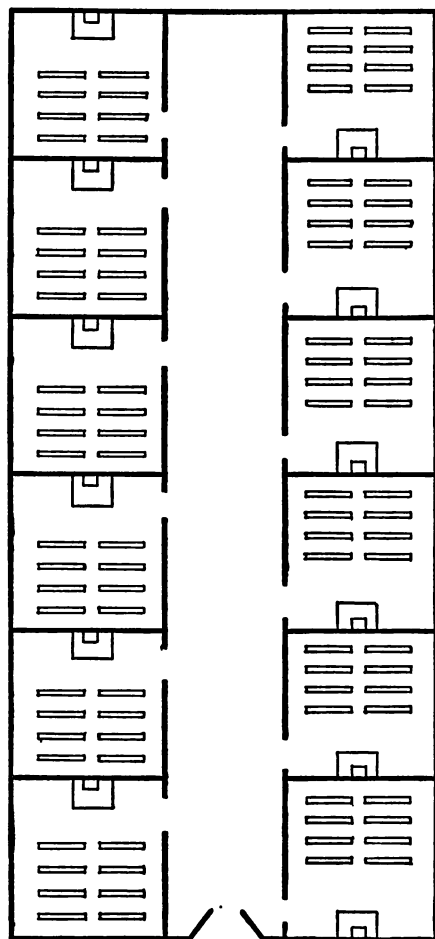
In these higher schools of Stuttgart there is invested at least £150,000. This sum of money

would not, I suppose, build such a beautiful and useful object as the *Polyphemus*, and it probably would not go very far if invested in 100-ton guns, but it seems open to question whether in the long run it would not be an equally good



I. REAL GYMNASIUM AND REAL SCHOOL.

investment of national money. We shall never get schools like these put up in our English towns unless higher education is systematically taken up by the State as it is in Germany.



II. BURGER SCHOOL..

I have indicated the manner in which, after these schools are built, people are induced to send their children to them. The national system of education has been at work for three generations, and Germany is now a sufficiently well-educated country to appreciate the advantages offered, and every German parent who can afford it sends his children to one of the higher schools, and being educated himself, he is competent to select the school which will best prepare his children for their future occupation. He is all the more tempted to do this because he knows that the school fees only represent about one-third of the actual cost of the education given. Whether he sends his children or not, he knows that indirectly in the shape of rates and taxes he helps to pay the other two-thirds, and being as a rule a man of frugal mind, he is no doubt induced to try and get as much as possible of his money back in the shape of education. This same feeling is no doubt

at work in the mind of the English parent, but it tends downwards rather than upwards, the elementary schools being the only ones which he indirectly supports.

Mr. Celschlager, the rector of the Real School, to whom I am indebted for much information, has given me the following summary of the expenditure and income of his school for the school year 1882-3. The total expenditure was £7445. The income from the fees of 1093 pupils was £2600. From this we see that, while the actual expenditure per boy was £6 16s. 3d., the amount of this paid per boy in fees was £2 7s. 7d. To make up the deficit, the Upper Real School (classes VII.-X., *ober-real schule*) is dealt with separately from the lower school (classes I.-VI.). Subject to additions and deductions, for the upper school the State pays two-thirds of the deficit, the town one-third ; for the lower school the State pays one-third, and the town two-thirds. The income was, therefore, derived as follows :—

			I.-VI.	VII.-X.
From fees	...	...	£2000	£600
From the State	...	...	1235	1100
From the town	...	...	1965	545
Total	...	...	£7445 *	

The principle underlying this arrangement is that the State is more especially interested in the higher education, and the town in the lower.

The bulk of the expenditure is of course on salaries. The masters are in the Government service, and are paid according to a fixed scale. A rector's salary will appear rather startling to English schoolmasters, especially when his responsibilities are considered. He has, in fact, the salary of a professor, with an additional £60 for discharging the rectoral functions. There are in the Real School fifty-two masters paid according to the following fixed scale :—

Rector	...	...	£280	per annum.
19 Professors	...	...	£175 to £220	„
32 Under Masters	...	...	£125 to £175	„ †

* Exclusive of gymnastic expenditure, which was £447 9s.

† After forty-five years of age an addition of £10 per annum

The expenditure on the other two high schools is at about the same rate and is similarly met.

The school hours in Germany are from 7 to 11 a.m. in summer, and 8 to 12 a.m. in winter, and 2 to 4 p.m., with, especially in the higher forms, lessons on certain days after those times, making up altogether from thirty to thirty-six or even more hours per week. In forms I. and II. the time is rather less. Wednesdays and Saturdays are half-holidays, as with us. The normal holidays are rather shorter than ours, but anniversaries occur frequently, and somewhat interfere with the work.

The time-table of a school of 1000 boys is, of course, an extensive document, but the German time-table, like the school building, is as simple and consistent as it can well be. The ten classes are subdivided into divisions *a*, *b*, *c*, *d*,

is made to the above scale, and another £5 after the age of fifty-five.

etc., according to the number of boys they contain, and each division, though doing the same work, is taught separately. For example, at the Real School the classes are as follows :—
I.*a*, I.*b*, I.*c*, I.*d*, I.*e*; II.*a*, II.*b*, II.*c*, II.*d*, II.*e*; III.*a*, III.*b*, III.*c*, III.*d*, III.*e*; IV.*a*, IV.*b*, IV.*c*, IV.*d*, IV.*e*; V.*a*, V.*b*, V.*c*, V.*d*, V.*e*; VI.*a*, VI.*b*, VI.*c*, VI.*d*; VII.*a*, VII.*b*, VII.*c*; VIII., IX., X.
—thirty-five classes in all, and there are on the staff forty-six masters, nearly all of them always available. This obviates all necessity for a master taking two forms at once, as often happens in our small schools; in fact, although the school hours are longer for the boys than with us, they are not so for the masters, who have a good many hours free, and not unfrequently a whole day once a week. The school lessons are one hour long.

Within prescribed limits, considerable liberty is allowed in arranging the syllabus of work for the year. This is drawn up by the rector, in

consultation with the masters, and is generally approved by the Education Department without alteration. This "programme," as it is called, printed *in extenso*, with other information respecting the school, constitutes the "year-book" and corresponds to our prospectus. It is, however, a much more formidable document, extending to thirty, forty, or even sixty, closely printed quarto pages, and frequently contains a learned essay by one of the professors of the school, and a chronicle of the school for the preceding year. Some hundreds of the German schools are associated, and for the payment of a small annual sum each school receives a copy of the programme of each of the others in the union. The advantages of this are obvious.

The respective schools are, however, very strictly bound with regard to the subjects taught, and the amount of time allotted to each per week in the different classes. It is this restriction which gives them their special

character, and which is one of the essential points of the German system.

The *Gymnasium* is a strictly classical school. The fact that boys cannot be expected to learn everything appears to be clearly grasped, and beyond a little science at the top of the school, no attempt is made to teach either science or art. About half the time is given to Latin and Greek, and it is *par excellence* the school which prepares for the university.

The *Real School* has an entirely modern course. No Latin or Greek is taught, and therefore they are able to devote more time to mathematics, science, drawing, and modern languages. In these modern subjects it has precisely the same rank as the *Gymnasium* has for classics ; its fees, limits of age, and organization are precisely the same. Its course leads up to the Polytechnic, a scientific college of university rank, and many of its pupils enter the engineering and scientific professions.

The *Real Gymnasium* is intermediate between the above two schools. Latin is taught almost as extensively as at the Gymnasium, but not Greek, while it gives less time to French and English than the Real School, but more than the Gymnasium.

It is difficult and unusual for a boy to leave one of these schools to go to another. A candidate presenting himself for admission is required to show that he can do the work which boys of his age are doing. A boy, therefore, for example, of thirteen, from class IV. of the Real School, would, if he presented himself for admission to the Gymnasium, be required to show that he knew as much Latin and Greek as the fifth class boy there, and having done no Latin and Greek at his other school, he would fail to gain admission, unless he had been privately prepared. A similar fate would meet a boy from the Gymnasium if he presented himself at the Real School, the difficulty in this case being

French and probably mathematics. The Germans do not seem to understand our system of passing boys from one school to another, up the "educational ladder" as we call it. They do not think of passing a boy from the "Volk-schule" to the "Burger schule," then to the Real School, and so on; indeed, they seem deliberately to throw difficulties in the way of it. A great many candidates for the higher schools come from what are called elementary schools; these are really preparatory schools, specially organized for that purpose. It may be instructive if I give details of the admissions last year into the Real School.

From preparatory schools	...	...	...	144
„ „Volkschulen”	...	...	...	1
„ the Gymnasium or Real Gymnasium	...	...	...	10
„ other real schools	...	...	...	9
„ the Burger schule	...	...	...	16
„ private schools, etc.	...	...	...	21
Foreigners	...	...	...	13
Total	...	...	...	214

In the smaller towns, however, where the schools are fewer in number, boys seem to be in the habit of passing more freely from the lower schools into the higher.

It will not, of course, be supposed that all the boys who enter the high schools go through them. This is done by comparatively few. The above number of admissions in a year to the Real School suggests a little over five years as the average time that each boy stays in the school. Many boys, as with us, leave between fourteen and fifteen for business or apprenticeship, and it must be remembered that many of these boys belong to the class which, with us, are in the elementary schools. This is especially the case at the Real School, where the work is better suited to their needs. A considerable number, however, are tempted to stay, to obtain the certificate entitling them to serve one year only in the army. This is done by passing through class VII. Last year 64 boys did so

at the Real School, while 17 received the leaving certificate from class X., having passed through the school.

The table which follows will be the briefest and most satisfactory method of showing the resemblances and differences which exist between the three schools. The three lines after each subject are for the three schools, the Roman numerals at the head denote the classes, often fivefold, but doing the same work, and the figures give the number of hours per week devoted to the subject.

Subject.	School.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
1. German Language and Literature	G.	5	4	3	1	1	1	2	2	2	2
	R.G.	5	4	3	1	1	1	2	2	2	2
	R.S.	6	5	4	4	3	3	—	—	—	—
2. Religion ...	G.	3	3	3	2	2	2	2	2	2	2
	R.G.	3	3	2	2	2	1	1	1	1	1
	R.S.	3	3	3	3	2	2	2	2	1	1
3. Mathematics	G.	4	4	4	3	2	2	5	4	4	3
	R.G.	4	4	4	4	4	5	8	10	12	10
	R.S.	6	6	6	5	8	8	9	10	15	12
4. Science ...	G.	—	—	—	—	—	—	—	—	4	4*
	R.G.	—	—	—	—	2	2	—	—	3	6
	R.S.	—	—	—	2	2	2	3	3	3	5

* Logic, etc., 2.

D

Subject.	School.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
5. History ...	G.	—	—	1½	1½	1½	1½	2	2	2	2
	R.G.	—	—	1½	2	2	2	2	2	3	1
	R.S.	—	—	2	2	1½	1½	2	1½	1	1
6. Geography ...	G.	—	1	1½	1½	1½	1½	2	2	2*	—
	R.G.	—	2	1½	1	1	3	2	—	—	—
	R.S.	—	2	2	2	1½	1½	2	1½	1	1
7. Latin ...	G.	12	12	12	12	12	13	8	9	8	8
	R.G.	12	12	12	11	10	10	7	7	5	5
	R.S.	—	—	—	—	—	—	—	—	—	—
8. Greek ...	G.	—	—	—	6	6	6	7	7	7	7
	R.G.	—	—	—	—	—	—	—	—	—	—
	R.S.	—	—	—	—	—	—	—	—	—	—
9. Hebrew and Italian ...	G.	—	—	—	—	—	3†	3†	3†	3†	3†
	R.G.	—	—	—	—	—	—	—	2‡	1‡	—
	R.S.	—	—	—	—	—	—	—	—	—	—
10. French ...	G.	—	—	—	—	3	3	3	3	2	2
	R.G.	—	—	—	6	5	4	4	3	3	3
	R.S.	8	8	9	7	6	6	5	5	4	3
11. English ...	G.	—	—	—	—	—	—	2	2	2	—
	R.G.	—	—	—	—	—	—	3	3	3	2
	R.S.	—	—	—	—	3	3	3	3	2	2
12. Writing ...	G.	2	2	1	1	1	—	—	—	—	—
	R.G.	2	2	2	1	1	1	—	—	—	—
	R.S.	2	3	2	1	1	1	—	—	—	—
13. Drawing ...	G.	—	—	—	—	—	—	—	—	—	—
	R.G.	—	—	—	3	3	4	4	5	4	4
	R.S.	—	—	—	3	5	5	6	6	4	6
14. Gymnastics and Drill	G.	—	—	3	3	3	2	2	2	2	2
	R.G.	—	—	3	3	3	3	3	2	2	2
	R.S.	—	—	3	3	3	3	2	2	2	2
15. Singing ...	G.	—	1	1	1	1	—	—	—	—	—
	R.G.	—	—	1	1	1	—	—	—	—	—
	R.S.	—	—	1	1	2	—	—	—	1§	1§

* Classical.

‡ Optional (Italian).

† Optional (Hebrew).

§ Optional.

I am not aware that details of the course of study in higher German schools have been published in England in any very accessible form; and as they are both interesting and instructive, I will now proceed to give a few particulars with regard to each subject in the foregoing table, taking them in order as they stand. In doing this it will be best to take the work of the school which gives the respective subject most attention, merely alluding to the others if necessary.

1. *German*.—It will be noticed that more time is devoted to this subject at the Real School in the lower classes, but that in the Upper Real School (VII.–X.) it is entirely discontinued. In the other two schools each class in the one gives exactly the same time to it as the corresponding class in the other. The Real Gymnasium course is as follows:—Graduated reading-books are used in I. to VI., and lessons are given in grammar, dictation, and composition. Recita-

tion of poetry is also included. In VII., the life and works of Schiller are studied, with Wallenstein and Brant v. Messina as special subjects, grammar, composition, and recitation being also taken. In VIII., the history of the German language, the history of German literature in the Middle Ages, and Voss's "Homer," are the chief subjects; in IX., German literature from the fourteenth century to Lessing inclusive; and in X., the literary history is continued, and selected portions of the works of Herder, Goethe, and Schiller studied. The Gymnasium course is very similar. How will the English curriculum at our classical schools compare with this?

2. *Religion*.—The religious instruction seems to be given fair prominence, and is generally taught by masters of the schools, if any are qualified by having themselves gone through a theological course. If not, visiting masters are engaged—as a rule local divines,—and careful arrangements are made for giving Lutheran,

Roman Catholic, and Jewish instruction as required. I could not learn that the subject is ever put into the hands of masters who are not specially qualified for it both by training and inclination. The divinity lessons are generally conveniently arranged either at the beginning or end of school time, so that boys not taking part in them need not be present at school. As in all other subjects, a carefully graduated course is arranged. I observed that Greek Testament does not come in at the Gymnasium as a substitute for religious lessons as it sometimes does at our classical schools, there being two lessons in religion independently of it, and I have accordingly placed it in the table under the head of "Greek," though both subjects are taken by the same master. As the Lutherans are most numerous in Wurtemberg, I give the course prepared for that body at the Real School. In that establishment there are at present (April, 1884)—

Lutherans	921
Roman Catholics	103
Jews	44
No profession	5
	<hr/>
Total	1073

A junior course occupies I.-III. Bauer's "Bible History" is worked through in the two lower forms, and revised in the third. In these and the next three classes the learning of religious poetry, all carefully specified, is made a very prominent feature. In IV., V., and VI., Luther's Small Catechism is learnt, and a more advanced Bible course begun in IV., continued in V., and concluded in VI. Religious hymns are sung by all the divisions of a class together in the *festsaal*. In VII., a course on the "revelations of God to man" in the Old and New Testament; in VIII., Bazler's Abridgment of Church History; in IX., "the Christian Faith, especially the Creed"; and in X., the History of Religion, with New Testament reading, concludes the course.

3. *Mathematics.* — The mathematical course seems very extensive, especially at the Real School, where it constitutes, in fact, the chief subject. It includes much work that is not heard of in our schools, probably because scholarships can be got without it, and the subject seems to be brought into much closer relationship with the drawing teaching and with practical life. One reason why more mathematical work can be got through is that the continental arithmetic, dealing more in decimals, is simpler than ours, and consequently takes up much less time in the lower forms than in our schools, where many boys are occupied more than a year with "weights and measures." Then, again, the Germans have got over their veneration for antiquity so far as to discard Euclid as a geometrical text-book. There is supposed to be something peculiarly bracing in the futile struggle which the average English schoolboy has to make with this ancient author; but in the

German schools they are anxious to get through as much work as they can and to have some definite result from it.

The mathematical course at the Real School is complicated and lengthy and arranged under many different heads. I will try to simplify and shorten it as much as possible.

Nothing but Arithmetic is taught in I.-IV.* In I., the four simple rules ; in II., the same, using large numbers, and also the same rules with the new (decimal) weights and measures, with mental arithmetic in both classes ; in III., revision of the foregoing, with vulgar and decimal fractions ; in IV., more difficult exercises in the preceding, easy mensuration of planes and solids, simple proportion (by first principles), easy exercises in percentages and interest, and practice ; in V., harder sums in preceding, with commission, stocks, discount, etc. ; in VI., con-

* To find approximately the average age of the boys in any class add eight to its number.

tracted multiplication and divisions of decimals, and commercial arithmetic. Commercial arithmetic, continued in VII., finishes the course, arithmetic, as such, not appearing in the work of VIII., IX., or X.

Geometry, and parallel with it geometrical drawing by the same master, begins in V., two years before Algebra, which is only taught in the Upper Real School, so that the great bulk of the boys leave without learning it. In V., the geometrical work corresponds in great measure to Euclid i., but problems are set which the pupils work out at home in exercise-books, and the geometrical drawing consists in the construction of simple geometrical ornament from straight lines and circles, the work being very similar to Pillet's course used in the French schools. This work is done with great neatness and accuracy, and is an excellent training in the use of mathematical instruments. A training in colour is also secured by allowing the pupils

to colour their designs. In VI., the geometry of the circle is taken, with proportion, similar figures, etc., and the geometrical drawing is further extended. In V. and VI., four hours a week are given to geometry, and two to geometrical drawing. In VII., the geometry is revised and deepened, and, combined with mensuration, is extended to polygons, while under the title of Stereometry, cones, spheres, etc., are studied. In the drawing course curves are introduced more freely, and architectural drawing involving curves and circles is commenced. In VIII., Muller's "Introduction to Modern Geometry" and Spicker's "Algebraic Geometry" are read, with the geometry, mensuration, and delineation of prisms, pyramids, and prismatoids; while in the drawing lessons the geometrical construction of the more difficult curves and their introduction into ornament occupy the year. In IX., the Stereometry is continued, with "Descriptive Geometry," to

some extent a revision of preceding work, and four hours per week are devoted to conics, which is got through in the year. In this class and X. there is no geometrical drawing. In X., there are courses of descriptive and analytical geometry, the former receiving four, and the latter (curves and planes of the second order) two, lessons per week. In addition, four lessons per week are given in integral and differential calculus and their applications, and one lesson per week on mathematical astronomy, *i.e.* astronomy of the solar system, time, and the various geometrical methods of delineating the surface of a sphere on a plane surface.

Nothing but arithmetic and geometry are taught in I.–VI. Algebra begins in VII. and goes up to simple equations of more than one unknown and problems involving them, three lessons per week being given. In VIII., quadratics, arithmetical, and geometrical progression, logarithms, compound interest, and annuities are

got through in four lessons per week. Plane trigonometry is begun in this class, and receives two lessons per week. In IX., spherical trigonometry, with repetition of the work of VIII., receives three lessons per week, the rest of the time of this class, as well as that of X., being given to the subjects already described.

Most mathematical masters will probably think this a full and comprehensive course of mathematics. It must be borne in mind, moreover, that the subjects are taken as the ordinary class work; they are not taught to a few boys who are preparing for examinations, as higher mathematics often are in English schools, while the rest of the form are plodding on at lower work. They know nothing of this method in Germany. In the higher forms of the Real School the promotions depend largely on this subject; and a boy cannot leave his form for the next at the end of the year, unless he has to a large extent mastered the work set down

for him. The mathematical course at the Real Gymnasium approximates somewhat closely to the preceding ; that of the Gymnasium is, of course, not so extended, and does not include conics and the calculi.

4. *Science*.—Although Science is given most prominence at the Real School, it is not altogether neglected at the others. At the Gymnasium it is not taken till class IX., when a course of one lesson per week in physics throughout the year, and a winter course of chemistry and a summer course of botany, are taken, the chemistry receiving two hours per week, and the botany three. In X., the weekly lesson in physics is continued, and two lessons per week are given in mineralogy during the winter, and one in geology and two in zoology during the summer. At the Real Gymnasium two lessons weekly are given in zoology to V., and two in botany to VI., when Science does not again appear till IX., in which class three

weekly lessons in chemistry are given, and in X., three in physics and three in mineralogy. Thus, any boy who has gone through either of these schools will have some little knowledge both of the classificatory and experimental sciences.

The Real School Science course begins in IV., with the classificatory sciences, botany in the winter and zoology in the summer, and the same arrangement is continued in V. In VI., mineralogy, a favourite German study, is taken up. The Royal Museum, a splendid institution, presided over by Professor Fraas,* a geologist of European fame, lends specimens to the school to illustrate the lessons, and the pupils are also taken there. In VII., three lessons a week are devoted to a complete course of mechanics and physics. In VIII., natural history is again taken up, including human physiology, classifi-

* To whom I am much indebted for personally showing me the collection out of hours.

cation of animals and plants, and practical and microscopic demonstrations. In IX., a more advanced course of mechanics, hydrostatics, etc., is taken, and the chemistry of the non-metals and alkalis. In X., two lessons per week are given in mineralogy and geology, including crystallography, the application of the microscope to mineralogy, and the geology of Württemberg. Two lessons are devoted to physics, concluding the advanced course begun in IX., and one to the chemistry of the metals, especially from the technological aspect, with the elements of organic chemistry.

Thus, in the Real School there is a complete junior course of Science in IV.-VII., and an advanced course in VIII.-X. It is somewhat surprising to find that little or no laboratory work is done in the schools. In this one point as regards science teaching we seem to excel them. Where they excel most of our schools, in this and all other subjects, is in the careful

graduation and completeness of the course, and in the fact that, making allowances for local conditions, the curriculum is the same in all schools of the same class. For example, the above course is that for the current year at Stuttgart. I have before me the programme for the Real School and Real Gymnasium at Ulm for the year 1879, and although the two schools are worked under one rector in the same building, and have only 530 boys between them, yet the arrangement of the work in the two departments practically corresponds with the above, except that at the Real Gymnasium, which is of a lower grade, and lacks classes IX. and X., that portion of the course is wanting. The natural history course comes on, however, in V. and VI., exactly as at Stuttgart.

5. *History*.—All the schools take this subject in all classes above II., and almost to the same extent. I give the Gymnasium course. In forms III. to V. it is exclusively ancient his-

tory ; in III., that of Egypt, Phœnicia, Assyria, Babylon, Medea, and Persia ; in IV., history of Greece to the time of Alexander, and that of Rome to the Punic wars ; while in V., Roman history is carried on, and the history of Germany to the time of Charlemagne. In VI., German history from Charlemagne to the present time is taken. In VII., ancient history is again taken more fully ; in VIII., the history of the Middle Ages ; in IX., modern history, from the discovery of America to the Peace of Westphalia ; and in X., from the Peace of Westphalia to the present time.

6. *Geography*.—This subject is taken to about the same extent, except that it is continued quite to the top at the Real School. The course at the latter institution is as follows :—In II., where the subject is begun, geographical terms are explained and illustrated, and lessons are given on the geography of the neighbourhood of Stuttgart by the aid of a large map, and

maps in general are explained, with special reference to those by Lichenstern and Lange. In III., the work of II. is expanded, and lessons given in historical and ancient geography (ancient history is taken in this form as in the Gymnasium, and the geographical lessons are evidently intended to assist it). Lessons are given also on the geography of Wurtemberg. In IV. the subject is the physical geography of Central Europe, and the political geography of the German empire, with map drawing. In V., the work of IV. is revised, the geography of the States of Europe other than Germany is taken. In VI., revision, as usual, the other four continents, mapping, and introduction to mathematical geography. In VII., the geography of Germany more fully—natural productions, commerce, and railways—and history of commerce, especially of Europe. In VIII., revision of the whole, especially German geography. In IX., the special geography of France, Switzerland,

Germany, and England, physical and political. In X., mathematical geography, which has been already given under mathematics. It will be noticed how the geography lessons gradually expand from Stuttgart as a centre : first Stuttgart and the neighbourhood, then Wurtemberg, then Europe, then the world.

7. *Latin*.—With regard to languages generally it will be noticed from the table that the schools give more time to them in the lower forms than in the higher, and as a boy advances he gradually gives more and more time to mathematics, science, and drawing where they are taken, and less and less to languages. This appears logical. The strong point of a little boy is his verbal memory, and this fits him better for learning languages than for the study of the latter subjects. Thus the hours given to Latin sink in one case from twelve to five, and to French from eight to three ; whereas those given to mathematics rise from four to ten, and in

another case from six to twelve ; those to science from two to five or six ; and to drawing from three to six.

It will probably be most acceptable if I give the Latin course of the Gymnasium, though it must also be borne in mind that it is almost equally extensive at the Real Gymnasium.

In the three lowest forms Hermann and Weckherlin's School Grammar is used. This contains exercises and passages for translation, and the portions to be done in each class are carefully specified. In III., in addition, "*Viri Illustres*" by Holzer, i.-xx., is read. In IV., Nepos, Holzer's "*Viri Illustres*," and Gaupp's "*Anthology*," i., are the text-books ; an exercise book is used also for composition. In V., Cæsar's "*De Bello Gallico*," Gaupp's "*Anthology*," ii., with composition, exercises, and monthly essays. In VI., selections from Cicero and Ovid, and Cæsar's "*De Bello Gallico*" continued. In VII., Livy, i. and ii., and Virgil's

"Æneid," i., ii., and xii. In VIII., "Æneid," vi.; Sallust's "Jugurtha" and "Catiline"; Cicero, "Pro Archia," "Pro Ligario"; and "In Catilinam," i., ii., and iii. In IX., selections from Horace's "Odes," "Epodes," "Carmen Saeculare," and "Satires"; the "Dialogues" of Tacitus; and Cicero, "In Verrem," iv. In X., the "Odes" and "Epistles" of Horace; Cicero, "De Oratore," and a portion of the "Germania" and "Annales" of Tacitus. Parallel with the reading of Latin authors, grammar and composition lessons are of course continued, and occupy about a quarter of the time, six hours weekly being given to the authors in the higher forms, and two to composition, etc.

8. *Greek*.—Greek begins at the Gymnasium in IV., with grammar and exercises, an easy reading-book, Mezger's and Schmid's Chrestomathie, part i., being added in V. Part ii. of the same reader is translated in VI., with another book of materials for translation into

Greek. In VII., the reading of Greek authors commences with selections from Xenophon's "Anabasis," i.-iv., and from Homer's "Odyssey," i.-v. As with the Latin, separate lessons are continued in grammar and composition in these upper forms. In VIII., "Odyssey," ix.-xxiv., with omissions; Xenophon's "Memorabilia"; and Herodotus, book i. In IX., "The Iliad"; Demosthenes, three "Olynthiac Orations," and three against Philip; Plato's "Apologia"; and "The Medea" of Euripides. In X., Plato's "Protagoras"; Thucydides, vi.; Sophocles' "Œdipus Rex"; and selections from Stoll's "Greek Lyrics."

9. *Hebrew and Italian* do not form any part of the regular course. The former is taken by pupils who intend entering the ministry.

10. *French*.—French receives considerable attention at all three schools, but more especially so at the Real School. There an introductory work in three parts occupies the lowest three

forms, and a more advanced grammar and exercise book is used in IV. to VII. with a reading-book. In VI. conversation forms part of the programme, and above that form no lessons are given in French and only French text-books used. In VII. and VIII. Bord's Grammar is used, part I in the former and part II in the latter together with a French reader (Helder's *Conversations-Lectüre*). In addition, portions of Dickens' "Christmas Carol" are put into French this is the French subject for this form, and portions of "Le Blas," Béranger, Lamartine and Flaubert are read, selections being also made by heart and recited. In IX. Bord's Grammar is used and Molière and "Le Blas" continued. In X. Molière's "Misanthrope," "Tartare" (they call it "Tartan"), with reading, recitation and translation from Rabelais, Molière, "Le bourgeois gentilhomme" and "Le bourgeois" are read. The French course given above is that of the

Greek. In VII., the reading of Greek authors commences with selections from Xenophon's "Anabasis," i.-iv., and from Homer's "Odyssey," i.-v. As with the Latin, separate lessons are continued in grammar and composition in these upper forms. In VIII., "Odyssey," ix.-xxiv., with omissions; Xenophon's "Memorabilia"; and Herodotus, book i. In IX., "The Iliad"; Demosthenes, three "Olynthiac Orations," and three against Philip; Plato's "Apologia"; and "The Medea" of Euripides. In X., Plato's "Protagoras"; Thucydides, vi.; Sophocles' "Œdipus Rex"; and selections from Stoll's "Greek Lyrics."

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the scheme issued last year is rather less extensive, so far as the authors mentioned is concerned.

11. *English*.—As with us, French is by far the most extensively studied modern language, and English ranks next, as German does with us. As the Real School does rather more English than the other two, I give the course there. It begins in VI. with Widmayer's Grammar, which, with a reading-book, is continued in VII. With grammar and composition continued to X., Dickens' "Christmas Carol" and Poe's "Raven" are read in VIII., Shakespeare's "Julius Cæsar" and some of the "Sketches by Boz" in IX.; and in X., selections from Macaulay's "History of England," and four of Dickens' short tales are read. Dickens seems a favourite author; his works appear in the programmes of the other schools, and in addition, we find portions of Milton, Byron, and Washington Irving.

French and English are almost without exception taught by Germans, who have sometimes, but not always, lived abroad. Several of the masters are occupied with each language, and they generally teach other subjects as well. There may be certain advantages gained by employing a native to teach his own language, especially in higher forms, but the masters of a German school are all trained and officially qualified, and it would no doubt be difficult to obtain foreign masters of equal efficiency, especially under existing salaries.

12. *Writing* is taught in the early stages from copies written on the blackboard, the pupils making the strokes simultaneously with the master at the words of command, "up," "down," "round," etc. Afterwards printed copies are used.

13. *Drawing*. — Considerable importance is attached to the drawing, both at the Real Gymnasium and Real School. At the Gym-

nasium it is not taught at all. There is a tendency in England at present to connect the freehand drawing lessons with the writing, and to teach both concurrently from the lowest class. In Germany the drawing does not begin till IV., when the writing lessons have diminished to one per week. In Germany they do not follow the objectionable method often followed in England of giving each pupil a small copy to himself, while the drawing master goes round instructing each boy individually, but the teaching is given to the whole class at once by means of a large copy, either drawn on, or affixed to, the black-board. This method seems preferable in every way, and judging from the works which I had an opportunity of inspecting, it appears to be very successful. At the Real School three lessons per week are given to drawing in IV., and five lessons in V., but of these latter two hours are given to geometrical drawing, which has already been most conveniently described

in connection with the mathematical course. This is also the case with VI., VII., and VIII. In IX. and X., the descriptive geometry, being of a much more mathematical character, is reckoned in the time given to mathematics. In V., large copies of ornament, human heads, and black-board copies are employed. In VI., the same is continued, and models are introduced. In VII., models are more prominent, and shading is taught, with the elements of perspective illustrated by skeleton models constructed of wire and straw. In some of the schools they employ a method which we might copy with advantage. Small plaster models, all alike, containing in low relief a pattern generally geometrical, are given out, one to each boy, and they are required to copy them on paper.* In VIII., drawing from the cast is continued, accompanied by lessons on the history of art, and on the theory of shadows. In IX.,

* This is also done in some French schools.

model drawing, especially from the antique, is continued, with anatomical drawings of the human body ; drawings by celebrated artists are also copied. Perspective is continued, and drawing from nature encouraged. Lessons on the history of art are illustrated by pictures from certain specified works on the subject. In X., the work of IX. is continued, with machine and architectural drawing, and lessons on sciography, or the geometry of shadows, are given. The preceding is a summary of the Real School course, but that at the Real Gymnasium is almost as extensive and thorough.

14. *Gymnastics*.—Great and equal attention is paid to gymnastics at all the schools. As will be seen from the table, it receives either three or two lessons a week in all classes above II. The lessons occur within the school hours, and the course of instruction is carefully considered and placed upon the syllabus with the other subjects. Each school possesses a spacious

and well-fitted gymnastic hall (*turnhalle*), large enough for marching and drilling, as well as for the ordinary gymnastic performances. Like the other subjects, it is taught by masters who have a special aptitude for it, and who hold a position in the school exactly the same as the rest of the staff. For example, the head gymnastic instructor of the Real School is Dr. Jager, who has the rank of "professor," and is the author of the standard text-book on the subject. Dr. Jager also takes a portion of the drill at the Burger schools, where I had the opportunity of seeing a class of girls drilled. They went through their evolutions with great precision and promptitude, singing at the same time. Frequently several masters of a school take a share in the gymnastic instruction. At the Real Gymnasium, for instance, the work is divided among ten masters, nine of whom teach other subjects as well. The two highest forms in the school are taught gymnastics and mathematics

by Professor Schumann, one of the senior professors. This arrangement gives a seriousness and dignity to the gymnastics which it does not as a rule attain to in our English schools, where it is often handed over to an ex-sergeant or corporal, who spends half his time in trying to keep the boys in order. The course is practically the same at all the schools. The following is that at the Gymnasium :—In III., exercises in line, exercises with an iron bar to strengthen wrists and hands, marching and running, horizontal bar, parallel bars. In IV., the same, with jumping and wrestling. In V., the preceding, with vaulting and practice in keeping a position of equilibrium on a bar which is not firmly fixed. In VI., the same ; in VII., the same, with bayonet exercise ; in VIII., the same, also throwing weights and clubs, high and wide jump, and foils. In IX. and X., the same continued.

The prime object of the course gradually reveals itself : it is to make the boys good soldiers.

When a boy has passed through VII. he receives the certificate allowing him to serve in the army as a "volunteer" for one year only, on condition that he pays his expenses, and it will be observed that he will then have been a year under instruction in the use of the bayonet. In comparing German and English boys in respect of gymnastic proficiency, we must remember that although on the average the German boy excels the English boy in the cut and dried performances of the gymnasium, yet the latter, in a large measure at least, makes up for his deficiencies by those less formal but more pleasant and healthy outdoor sports to which boys in Germany, and the Continent generally, are strangers.

The expenditure on gymnastics is separated from that on the other subjects of instruction (though, considering the circumstances, it must be somewhat difficult to do so), and the whole cost defrayed by the State and town. The

Real School gymnastic account for last year was £447 9s., that being the sum spent on instruction, inspection, apparatus, and care-taking. Of this total the State paid £181 9s., and the town £266.

These figures serve to illustrate the great importance which is attached to the subject, and the adjustment of the expense also shows that it is looked upon as more especially a national question, none of the money received directly from the boys in the shape of fees being carried to the gymnasium account.

15. *Music*, it will be observed, does not receive a very large amount of attention. It is only taught as a class subject in the lower forms, but there are often voluntary classes in the higher parts of the schools.

Such, then, is the scheme of work which, at the present day, is set forth for the higher schools of Germany. In all schools of the same class the subjects are awarded approximately

the relative importance shown by the figures of the table on pages 33, 34. The Education Department of the State determines for each school what subjects shall be taught, in what class each subject shall be taken, and, as it runs through the school, what time per week shall be devoted to it. The rector, acting in conjunction with the senior masters, decides, within the limits allowed, what books shall be employed, what portions shall be read in each class, and what master shall teach them. This scheme is submitted to the Education Department, and, if approved, is printed, and constitutes the programme of work for the year. As this system has been at work for some time we may probably assume that the work as set down in the programme, is such as can be conveniently done within the year. For getting through a course of this kind the German schools are in a much more favourable position than our own, inasmuch as they have not to prepare their pupils

for any external examinations. As all the schools are strictly comparable with each other class for class, a boy's attainments in the various subjects are approximately known when he has stated the kind of school he attends, and the class he is in. Moreover, as there is very little shifting of boys from one school to another in Germany, except in cases of removal of residence, there is very little disturbance to the work caused by the casual arrival of new boys in the classes ; and even when this does happen, a boy, having been doing pretty similar work elsewhere, soon settles down. The promotions are only made once a year, after the annual examinations, which are held three or four weeks after the reassembling of the school in September. During the interval the year's work is rapidly revised, the elder boys being allowed to stay away and read at home if they prefer it. The examination is conducted mainly by the masters, but an official inspector co-operates.

If a boy fails to pass the test of his respective class in the chief subjects, he is left behind for another year, so that he may go through the course again. If he fails to pass after he has been two years in the class, he is dismissed the school, and must either go to one of the lower schools or take refuge in a private institution.

Every year an elaborate statistical report is made out by the rector, and sent to the Education Department. It is in two divisions, one for the lower and middle school (I.–VI.), and one for the upper school (VII.–X). In this report are shown the number of pupils a year ago and at present ; the number who have left during the year, and, under eighteen sub-heads, where they have gone ; the number who have entered the school during the year, and, under eleven sub-heads, where they came from ; the age of the youngest pupil, of the oldest, and the average ; the religious profession ; the residence, under three heads ; and a few other particulars.

After the annual examination an order of merit list is made out for each class on a large sheet containing a great number of ruled columns. In these columns the following details for each boy are entered under their printed headings :—Place and date of birth ; whether foreigner or not ; religion ; profession and residence of father, or, if not a native of the town, of the person *in loco parentis* ; date of admission to the school ; date of admission to the class ; former school ; intended profession ; whether fit for promotion or not ; and, if fit, his position in the next class ; reports, in three columns, on ability, industry, and conduct ; then, in separate columns, reports on proficiency in all the subjects taught in the class. Except weight and personal measurements, which possibly may be taken in connection with the drill, there does not seem much more to be said about a boy than will be found in the above. These sheets are kept at the school in separate packets for the different

years, and details of any boy can be at once produced if required. Various certificates are awarded at this time, the most important being the leaving certificate, equivalent to matriculation, awarded to pupils who successfully pass the examination of class X. It admits the holder to the university or to the Polytechnic school, and thus corresponds to our matriculation certificate. It runs as follows :—

“ MATURITY CERTIFICATE

For the Pupil of the (name of school).

(name of pupil) , born at , on
 , religion, son of ,
 was years in the school, and year(s) in the highest class.
 Conduct, . Industry, .”

[Then follows on the next page a list of the various subjects taught, and a report on each.]

“ The undersigned Examination Commission has therefore granted this *Maturity Certificate* with the report [‘good,’ etc.].



(Signed)

Royal Commissioner.



Local School Commissioner

Rector of the School.”

Next in importance comes the Military Certificate, which can be had on passing the examination of class VII., or any above it. It runs as follows :—

“ (name) , born at , on
 , religion, son of ,
 at , has attended this school from the class
 up to class [VII. or higher], and has belonged to class since
 . In the classes which he has attended he has gone
 through the whole course.”

Then follow general reports on conduct, industry, and attainments. It is signed by the rector, and by the *ordinarius*, or class master.

Two or three boys who do especially well in their class examinations receive a diploma of merit, stating the subject or subjects, and signed by the rector. As with most of our schools, each boy takes home with him a report, stating his attainments and progress in his class subjects, with a general report on his industry and conduct. It is signed or stamped by the rector, and by the *ordinarius*.

The intrinsic value of the above certificates and reports is about a shilling a hundred, and no other stimulants in the shape of prizes are given, with this exception, that some of the schools have a small fund which enables them to grant whole or partial exemption from fees in certain cases clearly ascertained to be deserving and necessary.

If a boy, after being a year in the class, fails to gain his promotion, the following document is sent to his parents:—

“SIR,
“At the recent examination your son, _____, at present in class _____, failed to gain his promotion to the next higher class. He remains, therefore, a ‘veteran’ in class _____. To this form, which is to be duly signed by you and returned to the Rector, is appended this notice, that if your son should next autumn again fail in his examination, he must leave the school, in accordance with the regulations of the Ministry of Education.

(Signed)

Rector.
Class Master.
Parent.”

This generally produces the desired effect, and expulsions are not very common.

The work is adjusted among the various masters, subject to limitations to be shortly explained, very much as in our larger schools. Each class is specially in charge of the class master (*ordinarius* or *klassenlehrer*), who is responsible to the rector. In the lower forms the class master takes most of the work, but in the higher forms he does so less and less, till in X. every, or nearly every, subject has its special master. The rector generally takes some of the work in IX. or X., or both, but he is not of necessity the class master ; indeed, in the larger schools, he has hardly the time to undertake that additional responsibility.

The preservation of discipline in these large schools does not seem to present much difficulty. The German boys seem quieter and less irrepressible than English boys, and when school is over they go quietly away without making much disturbance, either in the school or the adjacent streets. The spacious, well-lighted

corridors and entrances enable a school to empty itself very easily. There is little corporal punishment. Each class master keeps a book in which complaints are entered, and which is inspected at frequent intervals by the rector. Rectorial interviews, home detention,* solitary confinement, and dismissal, constitute the grades of punishment.

The German school lesson-books have to be approved by the Education Department before they can be introduced into a school. They are much cheaper, and on the whole larger, than our own. They are drawn up very methodically. Two sizes of type are generally employed, and the matter is well broken up and arranged under headings and sub-headings.

* This home detention, or "house arrest," is inflicted on half-holidays, when the boy brings home a notice from the rector that he is not to leave the house. I quite agree with a writer in the *Journal of Education* that this is an objectionable form of punishment. We could, however, "Germanize" our schools without slavishly copying the small defects of the German system.

They are of the kind which the literary critic who is ignorant of teaching at once condemns as "cram" books. I take up, for example, the geography class-book of VI. in the Real School. It contains 180 very closely printed large 8vo pages (8 in. \times 5 in.). Embedded in the text are fifty-five very neatly engraved maps, both political and physical, the latter shaded to show different elevations, and at the end are twenty-four excellent wood engravings, illustrative of natural phenomena. The quantity of letterpress is as nearly as possible equal in amount to that in Dr. Cornwell's well-known book ; in addition there are the maps and pictures, and the price is 2s. A German reading-book used in the same class, containing long extracts from German authors, has 376 crowded pages as large as those of the geography, and the price is 1s. 3d. The enormous number of school books used in the country partly accounts for their cheapness, but allowing for this the margin of profit upon

them must be very small. The German school atlases are both excellent and cheap. Those of Schauenburg (price 9*d.*), and of Kiepert (price 5*s.*), are models of junior and senior school atlases. The physical map of Central Europe in the latter is a particularly fine specimen of cartography.

It now remains to speak of the German schoolmasters. From what has been already said it will be supposed that, as the Germans so fully realize the importance of the schoolmaster's work, they will naturally take every care, not only that opportunities are given for his proper training and preparation for his functions, but also that no unqualified persons are allowed to enter on the work of teaching. They quite realize the fact that high attainments in any branch of knowledge do not of necessity imply ability to teach it, especially to large classes of boys. Any candidate, therefore, for the office of teacher, not only has to

submit to an examination in those subjects which he wishes to teach, but he is also severely tested to see whether he understands how to teach them; and this not only at his first entrance upon his work, but at every stage as he advances in his profession. On first taking up teaching he is required to prove his capacity to teach elementary subjects to a low class; but this is not accepted as a proof that he is competent to take higher work, and if he wishes to do so he must again submit to an examination both in theory and in practice. These two tests of knowledge and ability to teach it lie at the bottom of the German system. There are various ways in which an intending candidate may prepare himself for one or the other, but till he has passed the first stage he cannot teach at all in a public school, and until he has passed the others in succession he cannot gain his promotions. To prepare for the *lehrprobe*, or examination in pedagogy, an

intending candidate would probably go to a training seminary, an institution in some measure corresponding to our training college, where he might possibly spend three years, the first two mainly devoted to study, and the third to practical teaching; that is to say, five hours per day in the practising school, with lectures before and after. At these institutions the annual cost is about £24, but, if needed, remissions are made, and the cost reduced to one-half or even less. At the end of the course the student is examined in German, mathematics, science, Latin or French, drawing, music, religion, and pedagogy; and if he passes he receives a certificate in one of three classes, each containing two divisions, his proficiency in each subject being stated thereon. He is now eligible for an assistant mastership in a primary school, to which he is soon appointed by the Government, no advertising being required on either side. If inspired with professional ambition, as

he generally is, he continues his studies, and, if he can afford it, ultimately enters either a university or the Polytechnic school, and passing another examination, is qualified to become a junior assistant (*collaborateur*) in a higher school. The way is now clear, though still by means of examinations. He qualifies as teacher (*lehrer*), upper teacher (*ober lehrer*) and professor in succession, the examinations, which are both written and *à viva voce*, being different as to subjects for the different classes of schools, and allowing considerable liberty of choice in the subjects taken. Having passed the examination does not at once secure the position or salary aimed at, but he is eligible to accept the post when offered, though he may have to wait some time.* The professorship examinations are in languages and history, or in mathematics and science. For the former, proof that the candi-

* Vacancies are notified in the official *Gazette*, and applications, etc., are sent to the Education Office.

date has attended for two years the philosophical course at a university is required, and for the latter, proof of at least one year's work in a laboratory ; but under special circumstances many remissions are made, the object being to keep the good men in the profession, and the weak ones out of it. The latter object is very effectually secured by the progressive examinations, and by the very low salaries given to all under the rank of *lehrer*, salaries which are not sufficient to tempt a man to remain in the profession if he finds he is incapable of rising higher. The salaries paid, even to masters of professorial rank, seem very small compared with those given in many English schools, even if we make some allowance for the higher value of money in Germany, but they are not relatively so, and they possess the fixity of a Government appointment, and their holders enjoy the social consideration attaching to a calling which is fully recognized as one of the

learned professions. Moreover, after a certain period of service, teachers are entitled to a pension.

The three schools whose work and organization have now been briefly described form the central objects in the scheme of German higher education as it is to be seen at work in Stuttgart. Above them are the universities and the Stuttgart Polytechnic ; below them the Burger school and the preparatory and elementary schools ; parallel with them to a certain extent are the girls' higher schools ; and supplementary to them the *Fortbildung schule*, corresponding in a measure with our mechanics' institute, and the *Baugewerk schule*, or technical school.

It is no part of the scope of this brief sketch to describe the German universities. It may be simply remarked in passing that they differ from those of England in being cheaper ; in having next to no scholarships to tempt students to them ; in being attended by a much larger pro-

portion of the population ; in their students being “unattached” ; and lastly, in the arrangement, which seems very strange to us, by which students who are to become clergymen, lawyers, etc., go through special courses, in order to fit them for their future professions.

Polytechnic.—It is difficult to make persons who are only acquainted with our English educational machinery, understand the position and work of the Polytechnic. It would be misleading to call it a technical school, as we understand the term in England. It is a scientific and technical university, especially devoted to all those branches of mathematics, science, and art which bear upon the architectural and engineering professions, and upon chemical industries. It is the road through which government appointments in the above-named branches are obtained, and all youths who wish to take a good professional position resort to it. As I have before said, it is to the Real Schools what

the universities are to the Gymnasiums. Its studies are arranged under four great classes—architecture, civil engineering, mechanical engineering, and applied chemistry. The full course lasts four years in the engineering departments, and three in the others. A matriculated student going through his course attends from thirty to forty hours per week, devoting on the whole, though arrangements vary according to the season and other circumstances, about half his time to lectures, and the other half to practical work in the workshops and laboratories, or in excursions, as the case may be. It is by far the largest and most magnificent educational building in Stuttgart; it contains collections of machinery and scientific apparatus of all kinds, and suites of lecture-rooms, laboratories, museums, and class-rooms, devoted to the purposes of the various professors. The teaching staff comprises some sixty professors, lecturers, and tutors (*privat docenten*), many of them well-

known specialists. In the programme for the year 1883-84, there are set forth no less than 158 courses of lectures and demonstrations, some occupying the winter half only, some the summer half, and some extending through the year, each course involving from one to six or eight, or even more, lectures per week. Many of these courses are of a highly special character, as, for example, "The Mathematical Theory of Elasticity," "Theory of Map Projection," "Theory of Potential," "Toxicology," "Electrolysis," "The Tar Industries," "Boilers," "Pumps," "Telegraphy and Railway Signalling," and many others on railway engineering. Last year there were 388 students, 251 being matriculated and going through one of the courses, and 137 "visitors." The ages ranged from eighteen to twenty-five, only nine being under eighteen, and twenty-eight over twenty-six. One hundred and fifty-nine of these students came from the Real Schools of

Wurtemberg, 39 from Real Gymnasiums, and 4 from Gymnasiums, and 49 from similar schools not in Wurtemberg. Of the rest, 50 came from other high technical schools and universities, 50 from lower technical schools, including the *Baugewerk* school of Stuttgart, 26 from other schools, and 18 from practical professional work. The fees are two marks (shillings) per semestre for each lecture per week, *i.e.* about a penny a lecture. For practical chemistry, two half-days a week, the fee is 20 marks per semestre, and so on in proportion. There are a few small exhibitions, varying in value from £12 to £2 10s. per half-year.

Baugewerk Schule.—As the Polytechnic is parallel with the universities, so the Baugewerk Schule is parallel with the upper half of the schools. It admits pupils to a preparatory class at the age of fourteen, and at fifteen to the technical course. As at the higher institution, there are several courses, the chief being those

of architecture, of surveying and agricultural mechanism, and of mechanical engineering. The first two occupy six years, and consist of as many classes, the last five years with five classes, the pupils in each passing through one class a year as in the schools. The hours of attendance are from 8 to 12 a.m., and 2 to 6 p.m., with certain exceptions, and some classes are held from 1 to 2 p.m., and from 6 to 8 p.m., the latter chiefly in non-technical subjects, such as languages. For the first two years of these long courses a certain amount of time is given to ordinary subjects ; but even there at least two-thirds of the time is reserved for mathematics, drawing, and such subjects as bear directly on the respective professions, and in the higher classes all, or nearly all, the time is devoted to them. In addition, there are in connection with classes I. and II. shorter courses of technical instruction bearing on the various handicrafts suitable for carpenters, glaziers, locksmiths,

tinners, etc. The building is very large, and well supplied with examples of all kinds, and although the demand for technical instruction is said to have fallen off somewhat, it contains at present 600 pupils.* As in all the other schools, the fees are low, viz. £3 12s. per annum. In order to enable a comparison to be made with similar English institutions, it may be useful to state that the 600 pupils form 21 classes, that each class meets on an average 40 hours per week, and that there are 35 teachers employed, each on an average 24 hours per week. It is, therefore, a school in the strict sense of the term, not an institution where the numbers are swollen by casual students coming for one or two lessons a week, and this fact should be borne in mind in making comparisons.

Fortbildung Schule.—The “Fortbildung” school which I have likened to a mechanics’ institute, is conducted in much less sumptuous apartments.

* In 1874-75 it had 1200.

It meets chiefly in the early morning and in the evening, only being intended for young men engaged in business. It is conducted by a board, appointed partly by the Education Department, and partly by a local tradesmen's guild which helps to support it, and is under the superintendence of Professor Assfahl, one of the senior professors of the Real School. The subjects taught are selected entirely with commercial utility in view, and are as follows :—Commercial correspondence in German, French, and English ; Italian, shorthand, bookkeeping, commercial arithmetic, and commercial geography. On the evening of my visit to this institution I found all the pupils engaged with commercial arithmetic. They were in three classes, about thirty in each, in three separate rooms, and knowing how very elementary much of the work in our mechanics' institutes is, I was curious to know what kind of commercial arithmetic the lowest of these three classes was at work at. I found

it to be a sum involving the selling out of stock in one country, changing it into foreign money, and reinvesting it abroad, it being required to find the change of income produced by the transaction. It is evident, therefore, that these youths are not attending the school to make up for a neglected education, but that they have been well grounded elsewhere. They are, in fact, the boys who have left the public schools for business at the usual age of fourteen or fifteen as with us. The fees are twenty-five shillings the half-year, but remissions are made in really necessitous and deserving cases after a pupil has been a short time in the school. The fees bring in sufficient to defray about three-fifths of the expenditure ; the remainder is equally divided between the Education Department and the guild. The number of pupils during the past year has been—in the winter session, 243 ; in the summer, 145.

The *Kunstgewerkschule*, or School of Art,

stands in the same relation to the drawing of the schools as the *Baugewerkschule* and *Polytechnic* do to the science. It is similar to, but perhaps more technical than, our English schools of art, and there are included in the same building galleries of paintings and sculpture.

Burger Schools.—The Burger Schools are intermediate between the three higher schools and the *Volkschulen* (corresponding to our public elementary schools). The boys' school contain about 1000 pupils, divided into 24 classes, and taught by a staff of 37 masters. The work is similar to, but more elementary than, that of the Real School. Mathematics, science, and drawing are taught, the latter extensively and well; French is optional; three hours per week are given to gymnastics, as at the other schools. The girls' school is conducted on similar principles.

Girls' Schools.—The two girls' high schools (the *Olgastift* and *Katerinstift*) seem to be

admirable institutions, and contain between them at least 900 girls. In addition to the ordinary subjects, French, English, natural history, singing, dancing, and gymnastics are taught. The school hours are from 8 to 12 a.m. and 2 to 4 p.m. The fees here are somewhat higher than at the boys' schools, and range from £3 to £6 10s. a year according to the class, and for foreigners about £1 a year more.

Stuttgart contains four primary schools (*Volk-schulen*), containing each about 2000 children. As must be the case with all such schools, the range of work is of course very limited, but they seem to be as carefully organized and as comfortably provided for as the higher schools.

We are now in a position to see more clearly where the persons of school age in Stuttgart are to be found, and what they are doing. It is estimated that at least one-seventh of a population should be under instruction. This for

Stuttgart would give about 17,000. Most of these can be accounted for as follows :—

At Universities,	say, at least	100	Higher than elemen- tary, 7550.
„ the Polytechnic	„	350	
„ „ Baugewerk Schule	„	600	
„ „ Art School	„	300?	
„ „ Two Gymnasiums	„	1,300	
„ „ Real Gymnasium	„	900	
„ „ Realschule	„	1,100	
„ „ Two Girls' High Schools	„	900	
„ „ Burger School for boys	„	1,000	
„ „ „ „ „ girls	„	1,000	
„ „ Volksschulen	„ boys, say	4,000	Elementary, 8000.
„ „ „ „ „ girls	„	4,000	
Total 15,550			

The rest are in the preparatory schools, private schools, or are receiving private instruction.

III.

THE perfection and thoroughness of the German system of education contrasts very strongly with our own. In a German state the Minister of Education ("Cultus Minister") is the head of a department which controls the whole of the educational machinery, from the people's schools at the bottom to the universities at the top. By this arrangement the schools work in harmony, each along its own line, neither overlapping on the one hand, nor leaving blank untouched spaces on the other. Wherever a school is seen to be needed there a school is established, whether it be an elementary school for the poorer classes or a higher school for the wealthier. All classes contribute to support

the schools, and all classes receive the benefit of their contributions. In England, all classes contribute to the schools, but only those people who are content to give their children the most elementary education get any benefit from them. Any person who wishes his son or daughter to have anything beyond this must pay the full price of it himself, and, what is much worse, loses all the advantages which might be secured by Government supervision. Mr. Mundella, in his examination on April 1st, 1884, before the Select Committee on the Education votes, is reported to have said that middle-class education was in a "chaotic state." It is worse than chaotic, because the term rather suggests that the schools exist but require revising and co-ordinating ; whereas, in fact, there are not half enough of them. Our endowed schools, under present arrangements, or even if they were placed under Government inspection, are utterly incompetent to do for the country what the German higher

schools do for Germany. If we are to put our higher education on a proper footing we must both multiply and popularize our schools. I have shown that in a German town, taken almost at random, sixty-four per thousand of the population are receiving a higher, and sixty-six per thousand an elementary, education. Now, I would ask any one interested in education to take the case of any town whose educational arrangements he happens to be acquainted with and compare it with Stuttgart. Under the action of our Education Act he will probably find that he can account for the hundred and thirty per thousand. But where are they? Nearly all in the elementary schools. According to a letter of Mr. Buxton in the *Daily News* of March 18, 1884, there are on the rolls of the elementary schools of London 557,000 children, a number which no doubt comes close to the above rate. It is certainly a matter of congratulation that these children are at school at all, and as compared

with the state of things ten or twelve years ago it is a very great advance. But in Germany, it will be observed, they have gone a step further. They have induced half the children to attend the higher schools ; and the details of the work of these schools which I have given will show that they are not higher merely in name. The necessity of giving some of the children an opportunity of going beyond the work of the ordinary standards has struck many of our most energetic School Boards, and they have endeavoured to do so by organizing special classes, higher board schools, etc. These higher board schools, however, only add to the educational chaos of which Mr. Mundella spoke.

Any reform, then, of our system of higher education should have in view, not merely the provision for such children of the middle classes as are now receiving what passes for an education in the numerous inefficient private day and boarding schools which are to be found in town

and country, but also the attraction of children from the lower level of the elementary schools. In order to bring this to pass the requirements of the people should be carefully considered, and the fees must be low.

So far as educational reform has proceeded at present, the leading idea which has developed itself is the system of grading, which has been before alluded to, combined with the idea that first grade schools should be "classical," and second grade schools "modern." Although the terms "first grade," "second grade," and "third grade" have not been officially adhered to in the schemes of the Charity Commissioners, yet, from the fees, course of instruction, limits of age, and other minor points, the reorganized schools readily fall under one or other of those heads as already defined. It is rather difficult to see what has decided whether a school is to be first or second grade, but as a rule, when a school, however small, has been reorganized

which has been in the habit of sending an occasional pupil to the university, it has been constituted a first grade school, on account, probably, of the very apparent absurdity of reorganizing a school, and preventing it ever after sending its pupils to college. But if, in a large town near one of these schools, a new foundation requires a scheme, it is generally drawn up on the second grade model ; boys are not allowed to stay beyond seventeen, Greek may not be taught as a part of the school work, and consequently, unless by special arrangements which practically violate the scheme, none of its pupils can proceed direct from the school to the university. As an example, the case of Leicester school may be taken. It was presumably made second grade because Loughborough school is within twenty miles of it, and is first grade, although Loughborough is only about one-tenth the size of Leicester. So that, in this case, we have Leicester, a town as large, as flourishing, and

as wealthy as Stuttgart, at whose chief school a boy, according to the scheme, can only remain on sufferance and by special permission if he wishes to go to college. As if to throw the absurdity into stronger light, a Leicester citizen has recently endowed the school with £10,000 for scholarship purposes. The people of Bradford, a town with 180,000 inhabitants, have never forgotten the vigorous contest they had with the Commissioners before they could induce them to make their school "first grade." The only apparent reason for not doing so was that Leeds, a town with 250,000 inhabitants and twelve miles away, had a first grade school. Probably another reason which had weight with the Commission was the notion that first grade schools are much more expensive to work than second grade, and as a consequence the fees must be higher, and thus the school lifted up out of the reach of a large proportion of the people who ought to use it; but if so, the

argument would apply equally well to all. We have, then, these first and second grade schools dotted about the country in the most casual manner without the slightest reference to the size and necessities of the towns they are in, large towns often having their one solitary higher public school second grade, and small out-of-the-way towns having a first grade school.

What do we find in the rare case of a town with two endowed schools? Of course, one is first grade and the other second grade. The former classical and rather dear for the upper middle class who can afford to keep their sons at school till eighteen or nineteen, and perhaps send them to college, and the other modern and rather cheap for the lower middle class, who will want to take their boys away when they are sixteen or so. It will be observed that this is quite different from the German method of looking at the question. When higher education was

undergoing reform there the idea of the classical school preparing for the university and the literary professions on the one hand, and that of the modern school preparing for higher and special institutions and the scientific professions on the other hand, was clearly grasped, and the Gymnasium and the Real School took their present form. But in educational position they are precisely parallel. They exist as separate institutions, because, for the most part, they teach different subjects. Each consists of a lower and an upper division. The lower contains at least four-fifths of the pupils, and in it a sound elementary knowledge of the subjects taught can be obtained, and a boy can go through it by the time he is fifteen, and then leave. This portion corresponds to a large extent with our second grade school. The upper division of the German school corresponds to the upper portion of our first grade schools. There boys of fifteen continue their work on the foun-

dition laid in the lower school, and remain, as with us, till eighteen or nineteen. A boy, therefore, who has been going through a modern course in the lower Real School, can continue that course up to a high standard in the upper school exactly in the same way as a boy similarly circumstanced at the Gymnasium, and thus science is placed on the same footing as classics. With us in a town so exceptionally provided so as to have two higher boys' schools, a boy of sixteen who has gone through the course at the second grade school, will, if it is well managed, have gone through a complete elementary course of physics and chemistry, and will have a fair knowledge of French, German, mathematics, and geometrical drawing. Having reached the age of sixteen, or perhaps seventeen, however, he is by the scheme obliged to leave, and if he wishes to reside at home and continue his education, he has no choice but to remove to the other school. Here the curriculum is en-

tirely different. Subjects of which he knows nothing occupy most of the school time, and some of the subjects to which he has devoted much attention are perhaps not taught at all.* It is like removing a boy from class VI. of a German Real School to the Gymnasium, a process unheard of except in very exceptional circumstances.† Such a change of school and of work was, however, evidently contemplated by the Commissioners, because the second grade school, if its finances allow, is often linked to the first grade school by means of scholarships; that is to say, the modern school pays its best pupils to leave and go to another school which gives, or ought to give, an entirely different sort of education. Surely there is something wrong

* As a proof that the so-called first grade schools do little scientific teaching of any value, see the class lists for the Cambridge Local Examination of December, 1883, where, out of 278 seniors who passed, only two (both from Wakefield) obtained distinction in science, against 90 in Latin.

† In 1882-83, 214 boys left the Real School of Stuttgart, not one going to the Gymnasium.

in this arrangement, and it is a matter which will certainly require reconsideration as time goes on.

The anomaly is the outcome of a want of appreciation of the difference in the work of the two institutions. The second grade school has been regarded as a school which boys may leave for business, or for the first grade school, as the case may be. This looks very well in theory, and is based on the assumption that up to the age of sixteen or seventeen the education given in either class of school is very much the same. But we know very well that it is not really the case, and, in these days of specialization, is becoming less and less likely to be so. Take, for example, the case of two boys, one destined for the Church and the other for the higher branches of engineering. Although, of course, they should know much in common, yet it is evident that the one will be drawn towards literature and classics, and the other towards

mathematics and science, long before they are sixteen. They should, in fact, go to different schools from the outset, where the studies are arranged with their respective ends in view. In order that they should be able to do so, our modern schools should not be limited as to age any more than the classical schools, and the idea of grading should be abolished altogether, thus putting the two great branches of education on an equal footing.

This rearrangement should be accompanied by a more uniform and descriptive nomenclature. For the one school either the title of "Grammar School" or "Classical School" should be retained, prefaced, if desirable, by the founder's name, and for the other the title of "Modern School," or something equivalent. This is the plan followed in Germany, where the name of the school is often accompanied by the names of persons, generally royal, who have interested themselves in its establishment or development.

But the descriptive title is always prominent, so that from the mere name of the school any person newly arrived in the town knows at once the precise character of the education given there. This is anything but the case in England, and even the prospectuses do not make the inquirer much wiser, as only the subjects taught are mentioned, often without any reference to the relative importance attached to them.

It has been shown how in Germany this differentiation of the schools has been secured, and is maintained by the hard and fast fixing of the time to be given to each subject. In our English schemes this is left to the governors, who often leave it to the head-master, and so it is possible for the governors or head-master to quite alter the character of a school, perchance for the better, but also perchance for the worse. But whether for the better or worse, it is evident that the two kinds of schools can be kept on

their separate tracks only by the intervention of some central regulating authority.

It will, of course, be a long time before our town populations are educated up to the point of sending sixty per thousand of their numbers to the higher schools, as they do in Stuttgart and other German towns ; but even supposing that, under favourable arrangements, half as many were sent, then there would be in a town of 50,000 people 1500 to provide with higher education, probably in the proportion of two boys to one girl. Omitting for the present the case of the girls, there would then be 1000 boys to provide for, enough, according to our English ideas of size, to well fill the two schools, one classical, the other scientific, as above described ; and, judging by the experience of Germany, they would, if the two schools were on the same footing, divide themselves about equally between them. Supposing each school to be divided, as in Germany,

into lower and upper divisions, the lower containing our forms I.-IV., and the upper V., VI., corresponding to the German I.-VI. and VII.-X. respectively, we should probably find the pupils would be in the ratio of 400 in the lower and 100 in the upper division. These numbers would be amply sufficient to constitute a first grade school, as we understand it. But in smaller towns the great bulk of the boys would probably leave when they had attained the top of the lower school ; and in this case local conditions would have to decide whether both, or one, or neither, of the schools should have an upper division, and if so, which, or whether an upper division could not be arranged common to some extent to both. In still smaller towns which could only contribute 200 or 300 boys to higher schools, it might be necessary to unite the two institutions in one building, but at the same time to preserve their distinctive features by a system of bifurcation.

The Real Gymnasium, it will be observed, finds no place in the scheme sketched above, though it would, perhaps, eventually be evolved from it. The Real Gymnasium has been created in Germany to receive boys from the Real School who wished to learn Latin, and boys from the Gymnasium who did not wish to learn Greek, and it was not organized till the other two types of school had been filled. The same may be said of the Burger School, which is composed of boys who required something better than an elementary education, but not so extensive as that provided at the higher schools. These two schools are, as it were, formed from the overflow of the others, and formed no part of the original system, and if our English education were being organized in the light of what has been done in Germany, it would be unnecessary in the first instance to take these schools into account. The case might be partly met by introducing optional Latin into the course of the *modern school*.

The idea of a town of 50,000 contributing 1000 boys to its higher schools will be considered exaggerated ; but, nevertheless, German towns of that size do more than this, and what is possible in Germany ought to be possible here. It is true that the educational desires of the English parent are not very great, but recent experience has shown that parents are really very ready to take advantage of a public school which gives a suitable education if the fees are such as to bring it within their means.

The question of the price at which higher education should be supplied to those who require it is vital. In Germany it seems to be conceded that the middle and upper classes have as much right to have their children's education provided and partly paid for by the State as the poorer classes have, and the position seems perfectly logical. But assuming for the present that grants of public money for the promotion of higher education are quite out of the question,

it does not necessarily follow that the Government should decline to take up the matter at all. It is surely the duty of the State to see that all classes are supplied with a suitable education at cost price at least. It has been shown that in Germany the price paid directly by the parent for higher education is less than £3 per annum, and that the actual cost is less than £7. In England, whatever the actual cost price may be, the charge is considerably more than £7 in our first grade schools, where the fees range from £10 to £20 for tuition, and not unfrequently even exceed the latter amount. So that in England our higher education is lifted out of the reach of the people because it is supplied at double what might be the cost price, whereas in Germany it is brought down to them because it is offered at less than half price. We cannot, therefore, expect to get our boys into the higher schools in very large numbers unless we reduce the fees very much. Whatever other improve-

ments are made, this lowering of the fees is essential.

The high charges for tuition at many of our schools is partly due to their extreme smallness, and consequent relative expense in management; partly to the absence of a desire on the part of the governing body to popularize them; and also partly to the fact that many well-to-do people in our provincial towns prefer to pay the higher fee in order to keep the school "select." This latter feeling appears to be entirely absent in Germany; as far as the schools are concerned, all classes meet on an equal footing. In one of the classes at the Real School I found the son of a butcher sitting beside the son of a count and general in the army, and I casually encountered a Russian prince attending the gymnasium. The attendance of the sons of the aristocracy at the public day schools of Germany is no doubt another small attraction which draws the sons of the poor people to them. In order

to show that our fees are unnecessarily high, let us examine the case of the school of 500 boys, of whom 400 are in the lower division, and 100 in the upper. We divide the 400 into ten classes, taught by four masters at £130 a year, and six at £150. The upper 100 we divide into three classes, and teach them with three masters at an average salary of £200 a year each. In addition we have a head-master at a salary of £500, and the expenditure of all kinds on the school amounts to £400 a year in addition. Of the head-master's salary we charge £100 to the upper division and £400 to the lower, and of the other general expenditure £100 to the upper and £300 to the lower. Our expenditure stands as below :—

LOWER DIVISION.

Four masters at £130	...	...	...	£520
Six „ £150	...	...	...	900
Share of head-master's salary	...	...	...	400
„ general expenditure	...	...	...	300
Total				£2120
Cost per boy, £5 6s. a year.				

UPPER DIVISION.

Three masters at £200	...	...	£600
Share of head-master's salary	...	...	100
„ general expenditure	...	...	100
Total	...	...	£800

Cost per boy, £8 a year.

It is, therefore, quite clear that, supposing the buildings and fittings to be paid for, a *large* first grade school could be conducted at fees of £6 and £9 a year for juniors and seniors respectively, with even a smaller fee still, say £4 a year, for the lowest form. It is true that the head-masters of our large first grade schools receive much larger salaries than £500 a year; but as schools do not exist for the benefit of head-masters, and as the services of many men, competent both as regards scholarship and organizing power, could no doubt be obtained for that sum, it is unnecessary to set down a larger amount under that head. The professional prizes under a well-organized system would be found in the schools of one thousand boys and upwards in our large towns.

It is rather remarkable that in Germany, where there are very few educational endowments, the educational system should be so perfect and the fees so low, while in England, where enormous endowments exist, the education should be so inefficient and so dear. That the endowments do very little towards reducing the fees, especially in first grade schools, will be seen by a glance at any educational handbook. Take, for example, Tonbridge and Dulwich, where the income from endowment in each case amounts to many thousands of pounds per annum. The fees for tuition at Tonbridge are £18 and £27; at Dulwich, £21. In each school a fine is levied upon each boy who is admitted—at Tonbridge, £3; at Dulwich, £1. At Charterhouse, another notoriously wealthy school, the tuition fee is £30! At the latter school, therefore, a class of thirty little boys pays for tuition £900 a year. Instead of being employed in reducing the fees, and so bringing

the schools within reach of the people, a portion at least of our endowments is employed either in giving a free education to a select few, or in paying the expenses of their pupils at the university. This is, no doubt, one of the good points of our educational arrangements; it is possible for a poor but clever boy to go through our high schools and then through a university free of expense. But the aid is in the majority of cases given unnecessarily, either because the boy is not worth spending the money upon, or because his parents can very well afford to pay the cost themselves; and even in deserving cases much more money is spent than need be on account of the high fees at our schools and universities. It is difficult to say where the remainder of the endowments goes, but as far as national education is concerned, it is pretty evident that the bulk of our large endowments is wasted. Now, assuming that under proper arrangements a higher education can be given

at fees respectively of £4, £6, and £9 a year, according to age, and further assuming that 30 per thousand of our population can by some means or other be tempted into the higher schools, let us inquire what amount of aid might reasonably be expected from the State towards the reduction of the school fees below the above rates. The number of children per thousand of population who ought to be at school may be stated as at least 130. Of this number we will assume 100 to be in the elementary schools, and 30 in the higher schools, as they ought to be, merely remarking that under present arrangements, 125 are in the elementary, and 5 in the higher schools. Dividing the 1000 of population then into two portions, one contributing 30 children to the higher schools, and the other 100 to the elementary schools, we should probably find that the first portion contributes to the national income at least as much as the second, and it may therefore be fairly assumed

that they are entitled to receive an equal amount back again in shape of education grant. Now, last year the education grant made by the State towards elementary education was at the rate of 15s. 10½*d.* per child, which would be for the 100 scholars, as given above, £79 7*s.* 6*d.* If the parents of the thirty scholars at the higher schools receives back even £60, it would amount to £2 per child, and so reduce the fees from the rates before mentioned down to £2, £4, and £7. This is the least amount of aid, therefore, that the middle and upper classes are entitled to receive from the State, viz. a thorough organization and augmentation of the higher schools and the provision of education at about £2 a year under cost price. As a set off against the aid given to the elementary schools by the rates, the endowments may fairly be retained for higher education, and if they were redistributed and employed to still further lower the fees, we might hope to have higher education

supplied in all our towns at fees ranging from 10s. to £2 per term, according to age. It would then be quite unnecessary to expend much money in scholarships, as the higher schools would, as in Germany, be almost as accessible as the lower. But it is obvious that unless in this or in some other way the fees are lowered, higher education will continue to be a luxury. To lower the fees to £2 below cost price as suggested, making allowance for the 15s. 10½*d.* already paid, would cost the State, if 30 per thousand were in the higher schools, the sum of £1,300,000 a year,* a sum much smaller than the cost of one of our annual fifth-rate wars, and would raise the education grant to a total even then less than one-half that for the army, and one-third that for the navy.

In the matter of school buildings we spend much less than in Germany, but owing to the conditions under which our schools are built we

* About two-thirds of a penny per £ income tax.

get still less in proportion for our money. When we build a school for two or three hundred boys the matter is often put into the hands of an architect who has never built a school before, and if there is plenty of money available he constructs a picturesque building with gables, oriel windows, and pinnacles; dark, narrow, winding passages and staircases; the classrooms small, awkward of access, and dimly lighted on the wrong side with stained-glass windows; the warming and ventilation defective; and the whole edifice very pretty to look at but quite unfitted for its purpose. Compare the plans of almost any of our higher schools with those of the German schools on pages 21 and 22, and the comparison will suggest another advantage to be derived from centralization.

They do not make provision for boarders to any large extent in Germany. The town boys attend the town schools, and the boys in the country either go to the nearest school which is

suitable, or are boarded privately in the towns, and attend the schools there. For example, there were last year attending the Stuttgart Real School in this manner 141 pupils, about 13 per cent., who were not natives of the town. Such arrangements are, however, hardly likely to commend themselves to most English parents, and if country parents are to share the advantages which may be offered to those of the towns, it will be necessary to make arrangements for supplying them with board at cost price as well as tuition. Domestic experience, and the fact that some private schools at any rate flourish with low boarding fees, suggest 8s. or 10s. a week as the cost of the board of an average boy. The larger amount will give for a school year of forty weeks the sum of £20 a year, and from this a further reduction might be made on boys going home for the Sunday. This brings into relief the fancy prices charged for board at most of our first grade

schools when boarders are taken at all. The reason of the high boarding fee is obvious. The taking of boarders is the one way in which an English schoolmaster may make a fortune, and looking upon it as a purely business transaction, he is of course perfectly justified in making his own terms, if the conditions of his appointment permit it. Moreover, it would perhaps be unfair to say that what he offers his boarders in the shape of domestic comforts and of his own society and personal supervision is not worth the money. But this again is a luxury, and the object aimed at is the popularization of education and the attraction to it of boys from the country as well as from the towns. To do this we must have *cheap* boarding arrangements, and these could be made if each town school had in the suburbs a large boarding establishment or hostel, with accommodation for one or two hundred boys, worked on self-supporting, but non-profit, principles, under the supervision of

one or two of the masters. Those parents who were able and willing would still be at liberty to make more expensive arrangements, but those with limited means or large families would be able to give their sons an education in a first grade school at a total cost for tuition and board of not more than £26 a year, a thing quite out of the question at present.

Any attempt to reorganize our higher education must be accompanied by some scheme having in view the professional training of masters. This was found to be a first necessity when our elementary education was taken in hand, and it is quite certain, whatever the shortcomings of the elementary teachers may be, that they know how to handle a class and how to manage a school from the very first day of entering upon their duties. They alone of all those engaged in English education can fairly claim to be members of a profession. They are specially trained for teaching, are solely occupied in it,

and their rewards, such as they are, lie within the limits of their professional work. The masters of our higher schools, on the other hand, have, as a rule, no previous preparation, they are often largely occupied with clerical work and boarding-house keeping, and their rewards lie, more especially when they are in orders, outside their scholastic work. In their appointment the chief matters which come under consideration are, firstly, the results of their college and university examinations, and secondly, their cramming ability, as tested by the success of their pupils at competitive examinations. Their skill as teachers of large classes, and knowledge of the practical details of school organization and administration, are looked upon as quite minor points. This may be seen from an inspection of the advertising columns in our educational papers.* As long as schools and

* The advertisement (March, 1884) for a new head-master at the Leeds Grammar School is instructive in this connection. It

classes are small, this want of a preparatory training mattered little, but now it is becoming a most pressing necessity ; and if a training of some kind and the acquisition of a teaching diploma were made compulsory, it would give the schoolmaster's calling a cohesiveness and professional standing which it is quite devoid of at present. Such a reform would have the further good effect of keeping out of school-work all who were not seriously intending to follow it up, and who do not, therefore, make any effort to interest themselves in the work. It is, of course, very desirable that young men

begins by informing all whom it may concern that the present head-master is "elevated" to the Deanery of Carlisle, hence implying that the head-master of the chief school of a town of a quarter of a million people is inferior in importance to a dean ; and it also illustrates the illogical passage from one profession to another. The advertisement proceeds to state that the head-master must be a graduate of Oxford or Cambridge, and the chance of getting suitable candidates is further narrowed by the requirement of "full clerical orders." Finally, as a sort of after-thought, it is mentioned that "some experience in tuition" is essential.

who are intending to enter the civil service or the Church should be able to find some remunerative employment while they are waiting, but if educational matters were on a proper footing, it would be no more possible for them to become assistant-masters in schools than for them to practise at the bar or assist in a hospital. If a man while waiting for a scholastic appointment were allowed to practise surgery or navigate a man-of-war, his incompetence would be more noticeable, but really not greater than in the former case. It is the popular opinion that any one, if possessed of a little education, will do for a schoolmaster ; and perhaps as things have been, and indeed to some extent still are, the popular opinion is not far wrong. But if we are to do for higher what we are doing for elementary education ; if we are to raise it out of the chaos in which it lies ; if we are to bring it in England even half-way up to the point it has reached in Germany, the professional train-

ing of the future schoolmaster will have to be regarded as a matter of the first importance. He must not only be master of the subjects he has to teach, but he must know how to teach them, not to two or three selected clever pupils, but to large classes. He must be made acquainted with all the various wiles and devices for maintaining the interest and the attention of his class. He must know how to divide his time between the various processes of examination, revision, and teaching ; how to arrange, inspect, and examine school-work effectively ; what portions of the subject should be done at school and at home, what are the special difficulties in each subject he has to teach, and the best method of overcoming them ; how to use his blackboard and maps ; on what principle to award marks, and how to make out lists of various kinds ; how to manage his terminal reports ; how to preserve order and repress the unruly ; and the hundred other things which an

efficient teacher should know. With the modern class-room system—the only efficient system for a large school, where every one has his difficulties to himself, and has no chance of seeing an experienced teacher conduct a class—it is almost impossible to learn these things after receiving an appointment ; and men often grow old at their work without apparently having the faintest conception that there are any particular or special methods in existence for the efficient teaching of such subjects as grammar, geography, or spelling respectively. It has been shown how differently they manage matters in Germany in this respect. There teachers from the lowest to the highest form a compact professional body, entering on their duties, like other professional men, with their capacity to undertake them guaranteed by a recognized diploma, and with age and experience advancing step by step to the more dignified and responsible posts.

To sum up this portion of the subject ; the points which require consideration in the reform and extension of higher education in England are these :—

1. The increase of the number of schools ; the regulation and co-ordination of their work ; and the placing of classical and scientific schools upon the same footing.
2. The lowering of the fees, by more economical administration, by State grants, and by the endowments.
3. The improvement of school buildings, to be obtained by insisting upon their being built within reasonable limits upon certain approved models.
4. The founding of boarding establishments, where boys from the country shall be boarded at cost price.
5. The training of masters.

Nothing but the intervention of the State can secure these much-needed changes, though they

could no doubt be brought about in England through the action of local educational boards partaking of the nature partly of our school boards and partly of our endowed school trustees. These boards should be charged with the provision of high schools for not less than 30 per thousand of the population, for which building grants should be obtainable when necessary, and to which annual payments of something like £2 for each scholar should be made by the State as long as the school is conducted in a satisfactory manner. This would, of course, involve an annual inspection, which would be a much more complicated matter than in an elementary school. It might, however, be simplified by the Government inspector simply reporting on the elementary work and general arrangements, and allowing the school to offer as a test of its higher work the report of some one of the several recognized university examining bodies. An inspection conducted on the lines of those of the

elementary schools, and followed by a grant on similar principles, would be quite impossible. The exact means by which we are to bring into existence and maintain a system of higher schools comparable to any extent with those of Germany is, however, a matter of detail with which this brief essay is not concerned.

Experience, both in England and in Germany, seems to show that the number of girls requiring a higher education is about half that of boys. One girls' school for every two boys' schools would, therefore, probably be sufficient. The more restricted curriculum would render it unnecessary to have more than one type of school, offering, as in those for boys, a comparatively elementary course in its lower department, and a more advanced one in its upper portion. The fees and general arrangements should be the same as for boys.

Of late years commercial depression and other incidents have called the attention of English

people to the fact that there exist in Germany and other continental countries special institutions intended to bring what is taught in the schools into immediate contact with practical life. These may be comprised under the general name of Technical Schools, and their work has lately been the subject of an exhaustive inquiry by a Royal Commission. These institutions vary much in character and aim. Some are intended merely to impart elementary but exact scientific instruction in the principles which underlie the various handicrafts, such as carpenting, shoemaking, etc. ; while others, like the Stuttgart Polytechnic, treat of the application of the highest mathematics and the results of chemical and physical research. to the manufactures and constructive arts We shall have no difficulty in organizing and developing schools of the first named and more elementary character in England should it be thought desirable—indeed, there are some

already springing into existence and doing useful work ; but with the respect to the latter and more advanced class the matter is not so simple. It has been already shown that the bulk of those who attend the Stuttgart Polytechnic are matriculated students of mature age, who have for the most part gone through the complete course at a Real School or some equivalent institution. A reference to the syllabus of the Real School will show what this means, viz. that before entering at the Polytechnic they have studied, in addition to the ordinary subjects and modern languages, trigonometry, descriptive and practical geometry, conics, integral and differential calculus, several branches of drawing, together with physics, chemistry, and other branches of science.

But in England we have nothing comparable to the Real School as a feeder of the higher Technical School. The nearest approaches to it are our modern second grade school, which dis-

misses its pupils at the age of sixteen or seventeen before they reach higher work at all, and the few scattered first grade schools which take up modern subjects to any extent worth consideration. Consequently, in the few attempts which have been made in the direction of higher technical institutions it has been found that the would-be students of adult age who present themselves are for the most part not only few in number, but as a rule far too ignorant to grapple with advanced work at all, and it has been found necessary to give elementary instruction in mathematics and science, and even in ordinary school subjects. Moreover, most of the adult students are only prepared to attend evening classes a few hours a week ; and to find a use for the building and occupation for the teachers, an ordinary day school open to boys of the usual school age is opened, and thus the proposed Technical Institution becomes what we may call an elementary Real School with evening

science classes, entering into competition with the other schools in the way so common in England. This will always be the case to a large extent till our higher schools are properly developed and in a position to supply a stream of students qualified to take up higher scientific and technical instruction.

While our technical schools sink down to a large extent to elementary work, we find some of our first grade town schools which are large enough to form a modern side, giving higher technical instruction, and thus introducing another element of chaos, the technical institution, for example, teaching elementary chemistry, and the school analytical chemistry and dyeing ; whereas, if things were properly ordered the technical institution would begin where the school leaves off, the latter devoting itself mainly to pure science, and the former to applied. Not only our technical institutions, but the large provincial colleges, such as those of Leeds,

Sheffield, Birmingham, Bristol, Newcastle, and even the Owens College at Manchester, the College of the Victoria University, all of which are supposed to be devoted to the work of supplementing the schools, really compete with the latter to a large extent, very many of their students being merely boys of school age. That this is really intended by the authorities of those institutions will be manifest when it is mentioned that the minimum age for candidates for admission is—at Manchester and Leeds, 14 ; at Newcastle, 15 ; and the other institutions, as a rule, admit boys equally young, either indiscriminately or on passing an examination of the most elementary character. It is not denied that these colleges do higher work also, and the well-known names which appear on their prospectuses are a guarantee that they are in a position to efficiently impart the most advanced instruction in their special subjects ; but the fact that they find it necessary to prepare for their

higher work by converting themselves in a large measure into schools, shows how necessary it is that our schools should be reformed and popularized before we can hope to fill our higher scientific and technical colleges with such students as fill the corresponding institutions in Germany. It seems to be thought here that the provision of a building and a staff of professors is all that is needed ; but the students are equally necessary to complete the undertaking, and the success of our higher technical colleges, when we get them, will very largely depend upon the character of the schools from which these students come. If the higher schools remain as they are—few, unsuitable, and expensive—a great deal of the energy of our technical institutions will still have to be devoted to preparatory work which ought to be done elsewhere.

Educational, like all other reform, must be preceded by a thorough knowledge of the weak-

nesses and deficiencies of the existing arrangements, and of what is really needed. If this brief and imperfect essay contributes in any small degree to this end, it will have served its purpose.

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